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# Telephone ENGINEER and MANAGEMENT

**NOVEMBER 1946**

*Featuring*

**SPECIAL EDITORIAL REPORT—**

***"The Louisiana Rate Making Plan". Page 32***

•

***Editorial on Page 21***

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The Cover Picture—

Part of the first rural radiotelephone system are these antennae on one Colorado ranch. One antenna is for receiving, the other for sending. (Photo Courtesy Michigan Bell).

•

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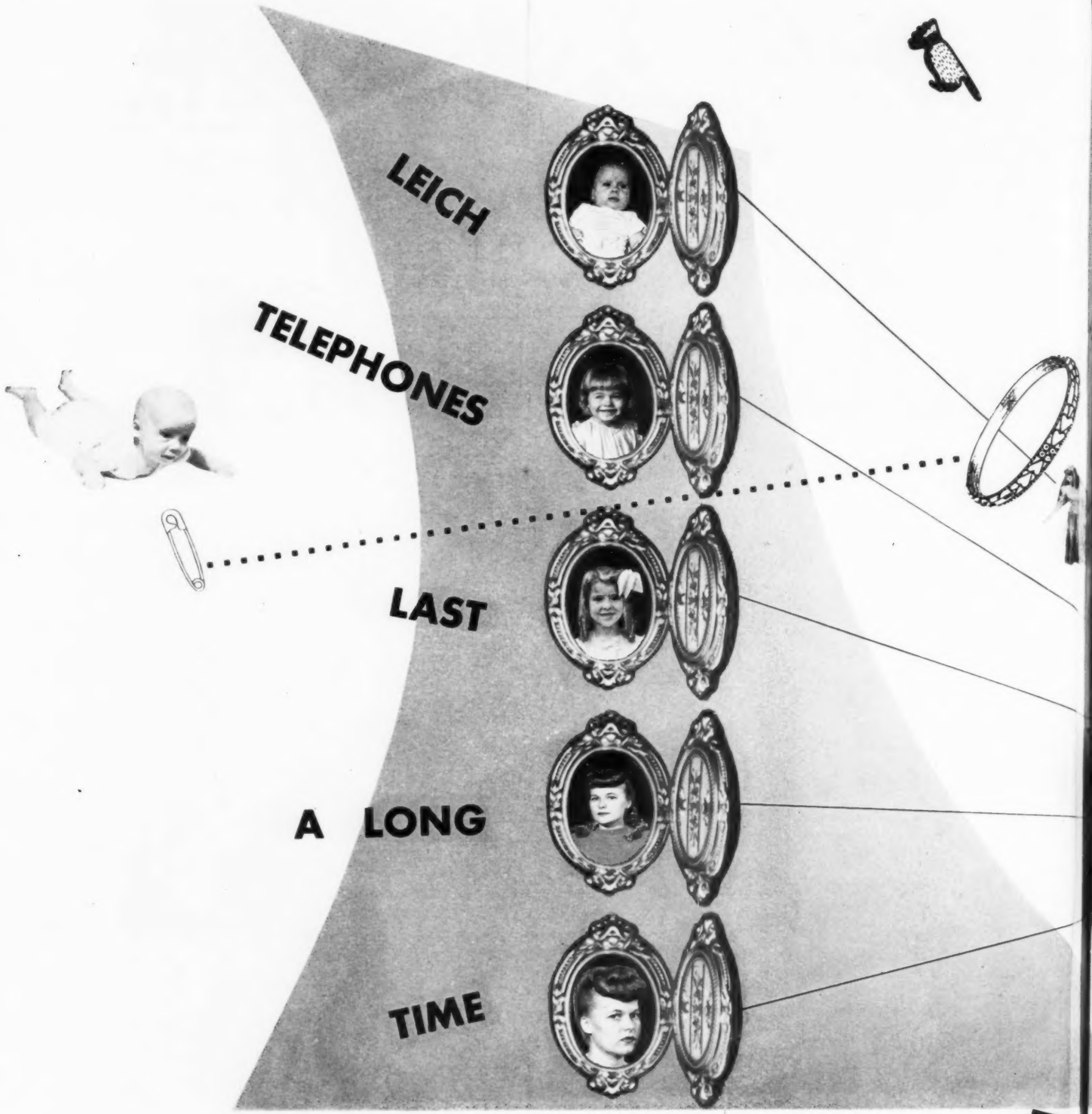
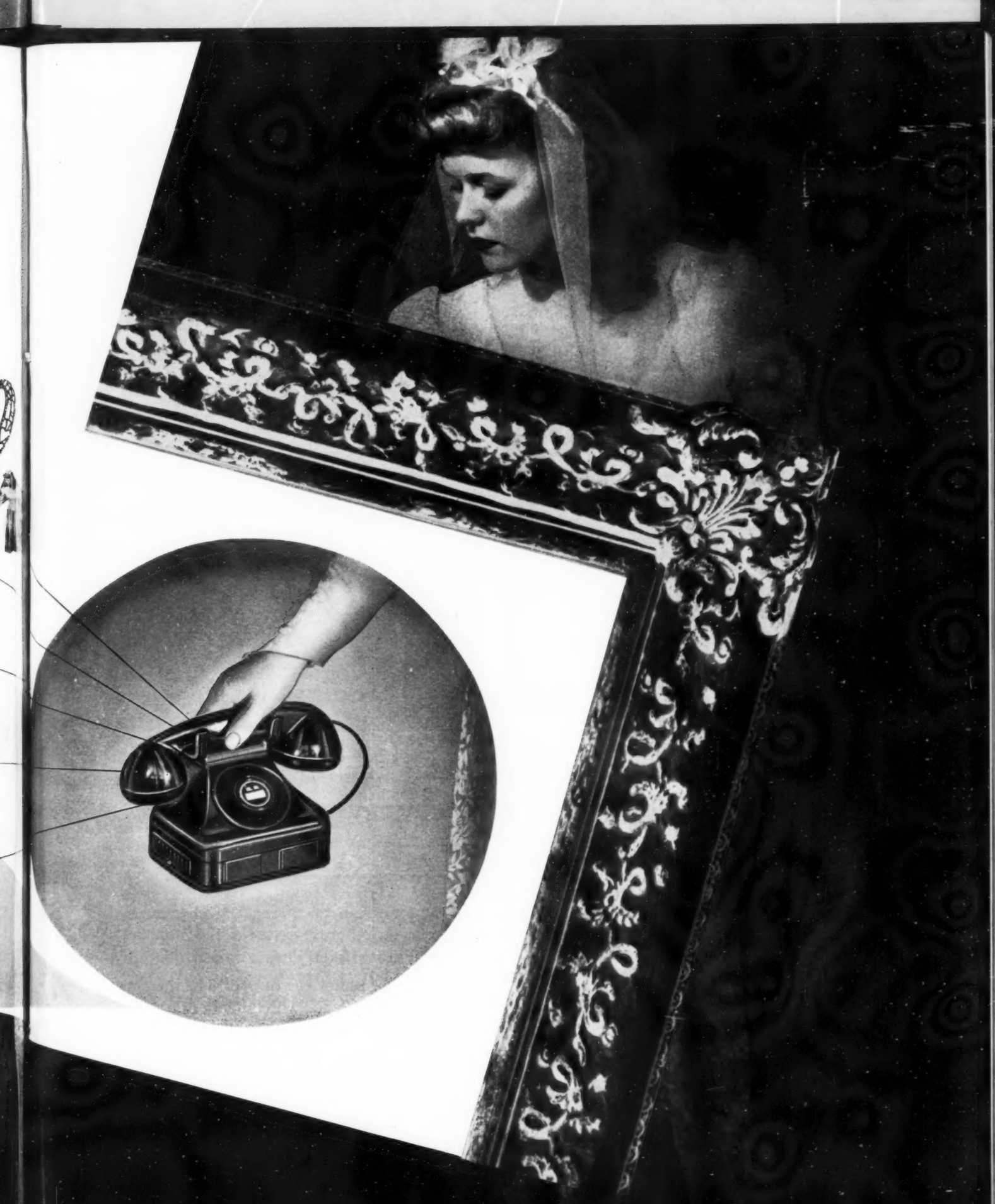



*From the time a little lady is big enough to reach the telephone, until she uses it to plan her wedding . . . it is very possible that the telephone itself remains the same. Especially if it's a Leich telephone. For here at Leich we make the kind of telephones that people do grow up with . . . that faithfully deliver good service long after normal retirement age. Telephone men who use Leich telephones know this. And they know, also, that this extra long service life helps them make* more *money. Would you like to know more about Leich telephones. Write Leich Sales Corporation, 427 West Randolph Street, Chicago 6, Illinois.*

Leich ANUFA



ANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 1907

## 15 years ago this month TWX service was inaugurated

Since November 21, 1931, when teletypewriter exchange service was first offered to the public, more than 15,000 TWX machines have been placed in operation. Today, this important service has become essential to press associations, stock exchanges, government bureaus, municipal police and fire departments and to a fast increasing number of industries for inter-plant and inter-department communication.

TWX service marks another long forward step in telephone communication, an achievement to be credited to the genius of American telephone engineering and to a strict observance of the industry's tradition of faithfulness and dependability.

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# Jay G. MITCHELL'S *Commentary*

***Editor's Notice: The opinions expressed herein by Jay G. Mitchell are his own. The Editor reserves the right to disagree with any of them, editorially or otherwise in the columns of this publication at any time.***

**MOBILE RADIO:** People who buy new cars are sure to ask about automobile radio telephone service. Next year or sooner they will demand, in my opinion, that their cars be equipped for radio telephone service. They will insist, within reason, that dependable communication from their car be available whether or not they are driving specified routes. To them telephone service from a car means readily obtainable communication. They are sure to be dissatisfied if they find communication by telephone from their cars possible in the city limits but impossible outside. In one city, without any pretense at making an investigation, I was told by one who should and does know that one newspaper, one taxicab company, one rapid transit system and doubtless many others were experimenting with or systematically using auto radio telephone service.

Why fumble around with limited range, limited service areas, multiplicity of frequencies and non-uniform rates. Why not get organized, as an industry, to supply this service to all who desire it and are able to pay for it. The railroads are now running coast to coast sleepers without change after fumbling the idea for years and losing untold revenue. One eastern railroad sensed the advantages **to the public** and agitated this matter until results were obtained. That same railroad, under the prodding of its chairman, is now advocating sensible sleeping car construction. Maybe auto radio telephone service is a parallel in the business of supplying telephone service.

If this service is not standardized there will be a crop of companies trying to supply it, in my opinion, and demanding toll service from their mobile units. This will easily result in embarrassment to telephone companies, regulatory commissions and the public. Rates appear to be entirely secondary, except that they should be fixed at ample levels to permit of rendering the service economically, and should be uniform. Engineering conservatism cannot be exclusively relied upon in this matter for guidance.

• • •

**VOCATIONAL EDUCATION:** It is our opinion that technical courses open to young men planning on service in the field of communication should be definitely slanted to that field. In a letter recently received from one of the leading technical schools our comments along that line of thought were questioned. Present developments in the science of communication make

the preparation of such courses almost a necessity. The establishment of a new degree, COMMUNICATIONS ENGINEER, with specific supporting courses required, not elective, is needed.

In a recent address Professor Hamden L. Forkner of Teachers College, Columbia University, urged that the CORE of the high school curriculum be the things that are of the greatest concern to boys and girls, and not what is the greatest concern to teachers. We are pleased to have this indirect endorsement of the idea of specialized educational preparation for later work from an authority.

• • •

**NATIONAL FARM ELECTRIFICATION CONFERENCE:** On November 7 and 8 the National Farm Electrification Conference will be held in Chicago. It is possible that this conference may consider questions of interest to telephone companies. It should. Such subjects might be Joint Pole Line Construction, Carrier Current Telephony, and others. At any rate in later meetings of this sort it would be wise for the telephone industry to have some sort of cooperative representation.

• • •

**RURAL TELEPHONE BATTERIES:** Telephone companies serving rural telephones will find it advantageous to make necessary battery renewals now. A trip down the country roads with a barrel of new batteries in the truck will eliminate the necessity of making long and expensive trips to individual subscribers' locations later on in the winter when batteries that should have been renewed cease to function.

• • •

**TOLL REVENUE:** The Toll Compensation and Settlements Committee of the United States Independent Telephone Association announced the completion of an agreement with representatives of the Bell companies which should result in increased compensation to connecting telephone companies on toll business. The working out of new contracts under this arrangement should proceed as soon as possible. I suggest that the necessary steps should now be taken because delay in settling your toll compensation may result in some unnecessary complication in local service rate cases.

• • •

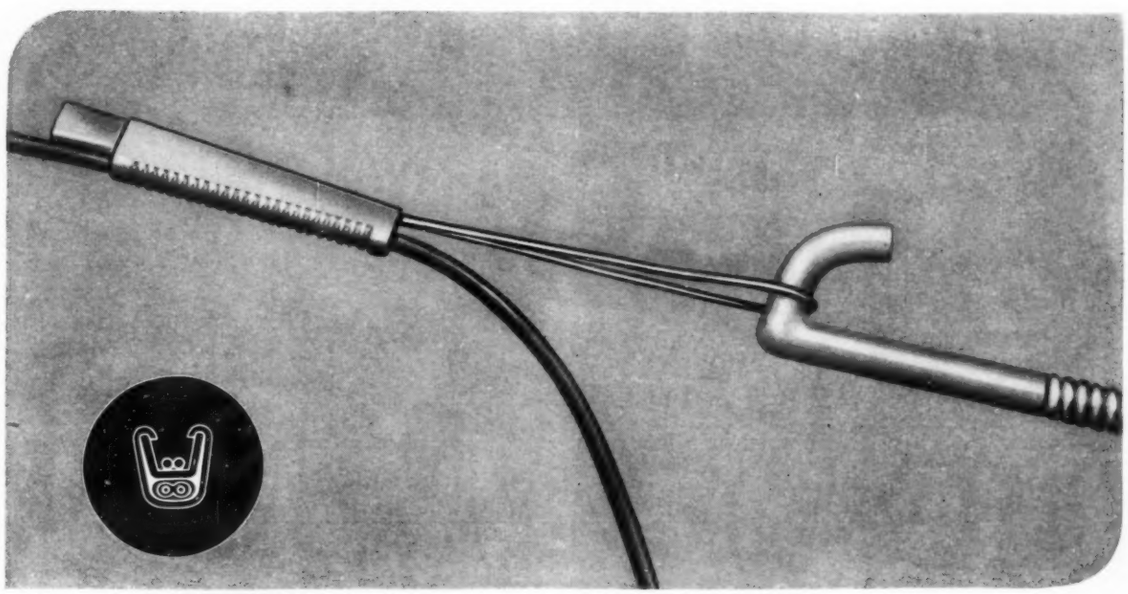
**NUMBER PLEASE:** In Wichita, Kansas, Ernie Tajcman tried to telephone invitations to a long list of Wichitans, on one number always got a busy signal, discovered after twenty minutes that it was his own. (Copy of Press Item.)

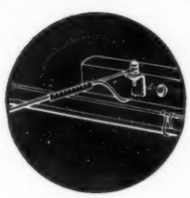
• • •

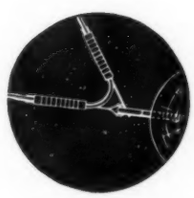
**MODERNIZATION:** New York Central is purchasing new modern coaches and parlor cars in order to provide high speed and convenient schedules between Chicago, Detroit, Indianapolis, Cleveland, Toledo and Cincinnati. Approximate cost 56 million dollars. That is modernization to meet post war standards. The object, doubtless, is to retain business against the dollar competition of other kinds of expenditure. Telephone companies, big and little, can and should follow the example of the New York Central and modernize their service to the limit of their ability with profit and increased support from the public.

Jay G. Mitchell

# "Reliable"
# is the word for it!







50,000,000 Reliable Drop Wire Clamps can't be wrong! Reliable Drop Wire Clamps (1) prolong the life of drop wires by permitting free swinging at the support and place all wear on the hardware, (2) permit stringing and sagging of service drops before cutting wire, (3) automatically tighten under load assuring a firm grip without damaging insulation, and (4) eliminate sharp bends in the wire. Build for the future—specify Reliable.

**RELIABLE ELECTRIC COMPANY**

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OVER 35 YEARS' SERVICE TO THE TELEPHONE INDUSTRY

Who, since 1926, has sold
all of the Telephone Directory Advertising for the largest Independent Telephone Company in ★Tennessee?-Answer-
L. M. BERRY & CO.
Main Office: Telephone Building, Dayton, Ohio
★The Inter-Mountain Telephone Co., Bristol, Tenn.-Va. operates 36,409 Telephone Stations from 29 Exchanges in Tennessee and Virginia.

## "It Seems to Us"

Roland C. Davies, editor of Telecommunications Reports and chief of our Washington Bureau is getting to be a confirmed air traveler. In covering the news from a national viewpoint he is now attending the National Association of Railway and Utilities Commissioners convention in Los Angeles. The NARUC has several matters of importance to our industry on its agenda.

●

This is the month of state telephone conventions. During November the states of Virginia, North and South Carolina, Alabama, Missouri, Georgia and Florida will see their associations convene. The seven conventions are of much importance and we expect attendance records to be broken.

●

We glimpsed John Hastie from a distance recently while in Chicago's Loop. Many of you old timers will remember him when he was associated with our contemporary as a staff member. He keeps in touch with over 100 telephone men friends as directing head of the Chicago office of one of the world's largest life insurance companies.

●

James H. Kellogg, president of the Kellogg Switchboard & Supply Co., has a unique hobby he shares with his wife. Ceramics, we mean everything on the subject from mud to finished product, is a subject they can discuss with authority. That is his secondary hobby though as his company is his chief interest.

●

Another telephone man, H. E. Clapham, director of Publicity for the Gary Group Companies, has joined your editor in his hobby of photography. Herb is not new to this subject and we hope him much more success than we had in our recent USITA convention pictures. It is quite a hunk of hobby, believe me!

●

Two new features are included in this issue. The first of a series of Special Editorial Reports start in this issue with a staff report on "The Louisiana Rate Making Plan." Further Special Reports will be issued from time to time on subjects of prime importance to our industry. This one is most important—start reading on page 32.

●

When you near the end of the magazine you will notice a new monthly feature by our Managing Editor John G. Reynolds. His "Back of the Book" will allow him to get things off of his chest and out of our hair. We think you will like his column and would appreciate your comments.


# Telephone ENGINEER and MANAGEMENT

THE NATIONAL TELEPHONE MAGAZINE

Volume 50 Number 11 Since 1909 November, 1946


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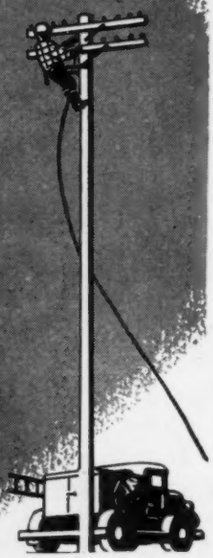
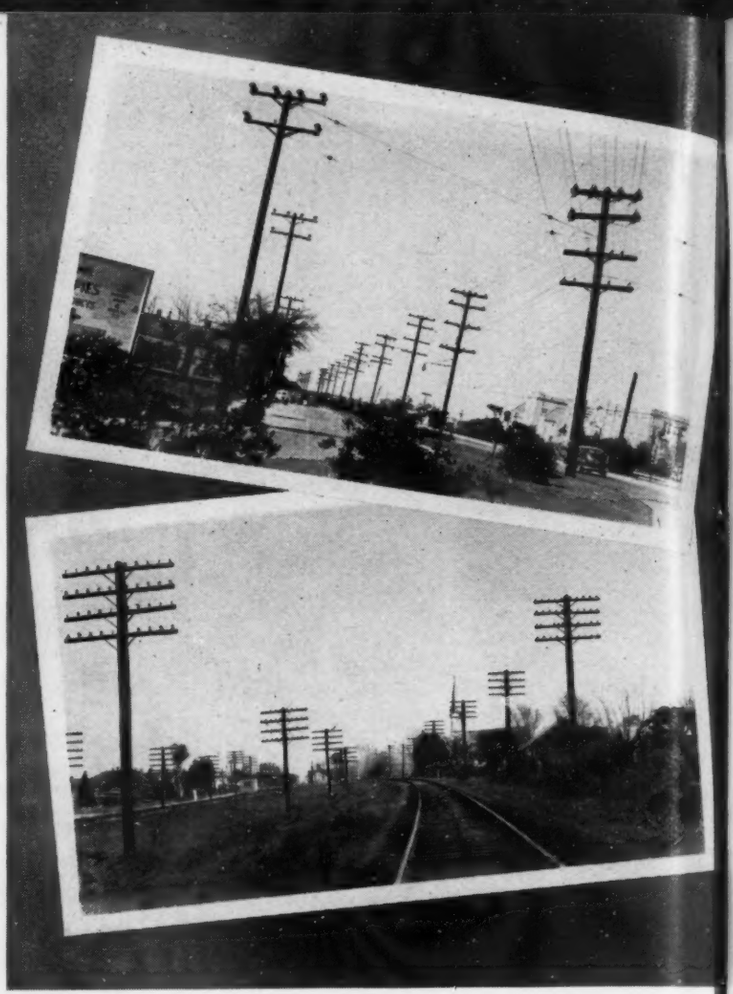
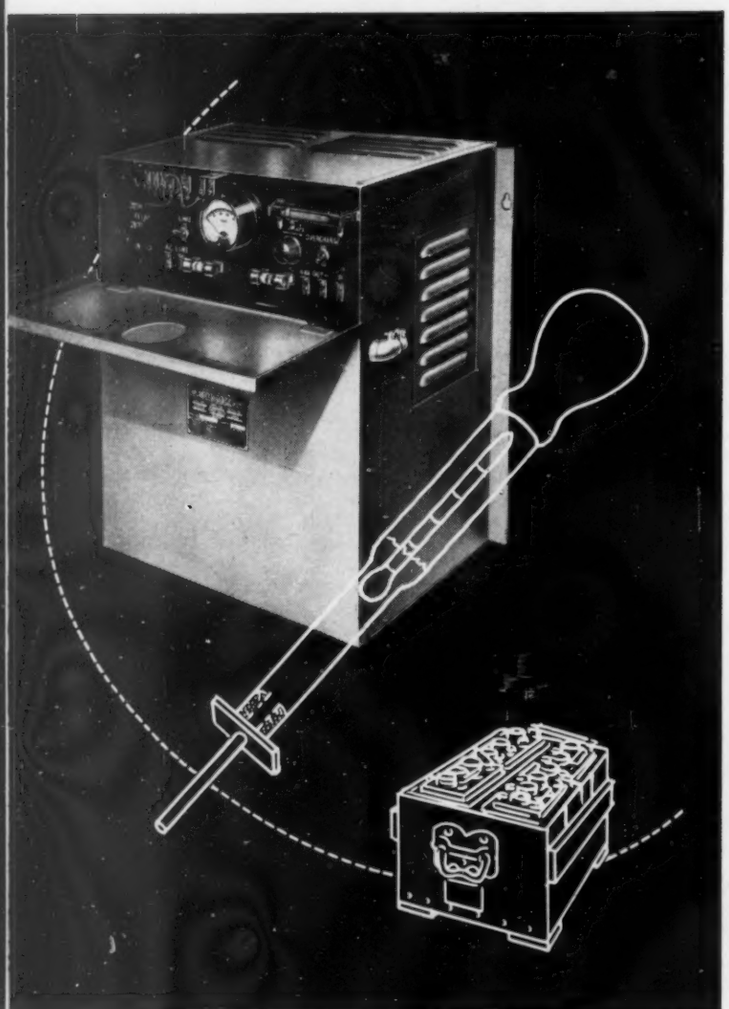




**Long Life Expectancy** is built into pressure-treated Southern Pine Poles and Crossarms. Carefully and thoroughly treated by the AMERICAN CREOSOTE WORKS, INC., these poles have the extra durability required for dependable service under the toughest climatic conditions. For longer lasting, stronger poles, specify "Pressure-Treated Southern Pine."



**Never Over, Never Under.** Storage Batteries reach their maximum life expectancy when you use the RectiChargeR automatic method of charging. It keeps batteries fully charged at all times and puts an end to operating troubles caused by under- or over-charging. RAYTHEON MANUFACTURING CO. offers this sure method to keep storage batteries constantly "healthy".

There's three-way satisfaction when you concentrate purchases of line supply and construction materials at a single, responsible source: (1) The *quality* is right—all products are backed by the famous Kellogg DOUBLE GUARANTEE; (2) The service is right—orders are intelligently handled by experienced people; (3) *Delivery* is right—orders are shipped from the nearest of over 50 strategically located distribution points.

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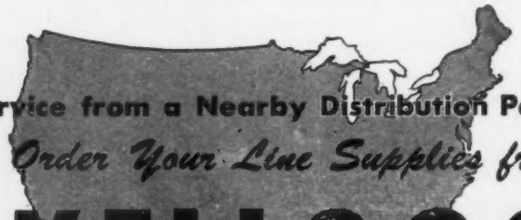

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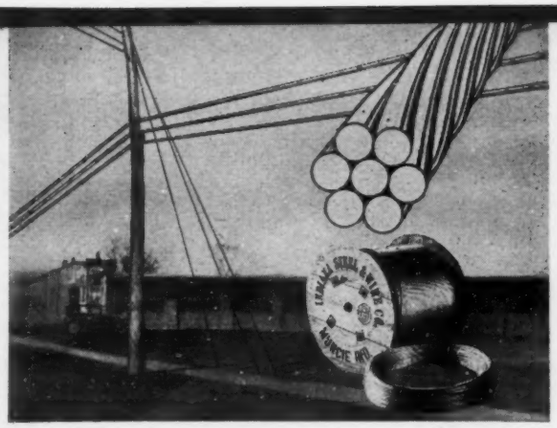
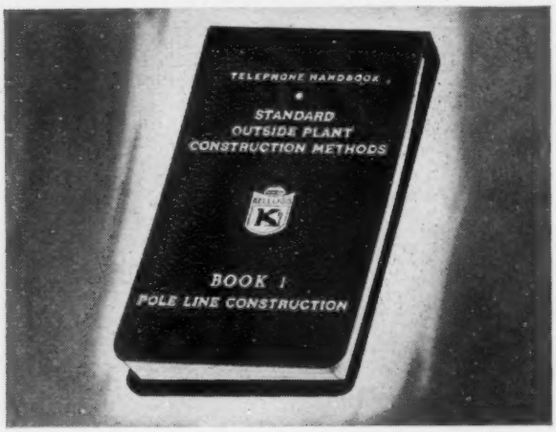
# KELLOGG

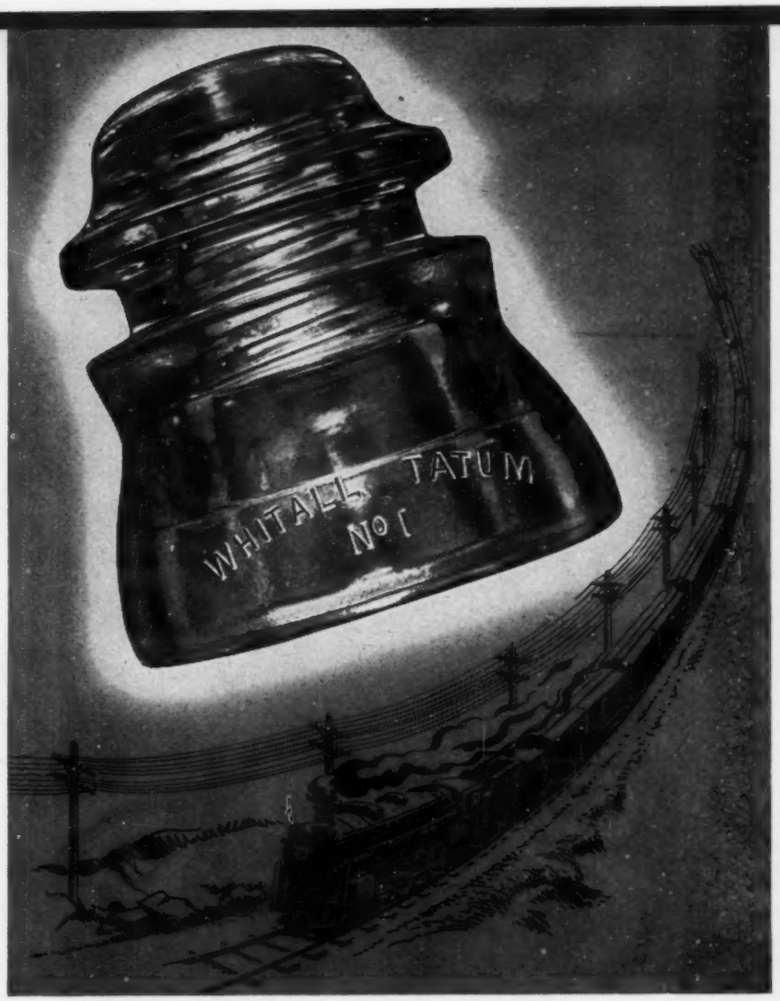
**LINE UP WITH KELLOGG FOR LINE SUPPLIES . . . . DOUBL**



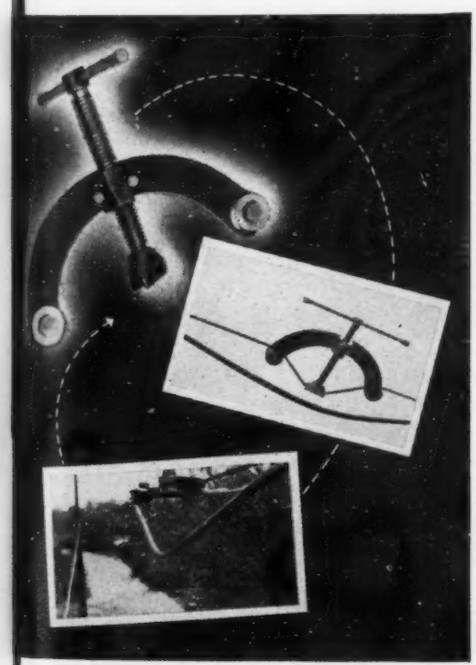
**The Time-Tested Steel Strand.** A heavy, ductile, tightly adherent zinc coating, applied by the famous Crapo Galvanizing Process, provides lasting protection from corrosion in Indiana Crapo Steel Strand. Made by INDIANA STEEL & WIRE CO., its rugged strength minimizes maintenance.



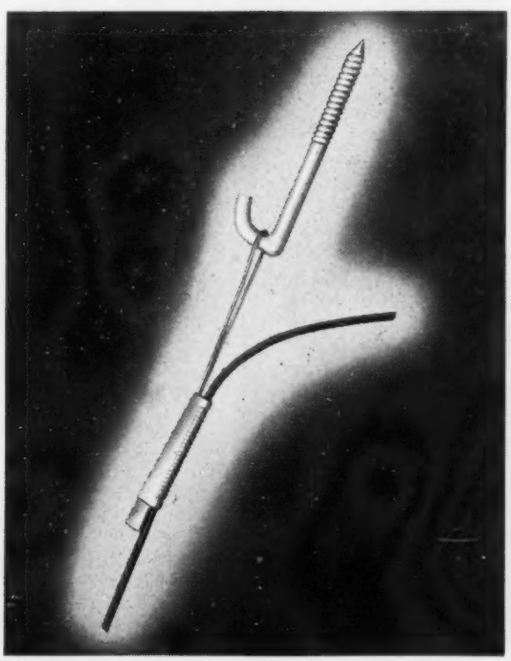

**Packed With Valuable Information!** Here's a helpful new handbook for field men—loaded with valuable "tips" on outside plant maintenance and pole line construction. Durably bound, it contains 364 illustrated pages. Pocket size for ready, on-the-job reference. Order from KELLOGG.




**Meet Every Service Need.** No matter what your requirement, there is a size and style of Armstrong's Whitall Tatum Insulator to meet it. Products of ARMSTRONG CORK COMPANY, these quality insulators feature crystal clarity of glass, accurate gaging, and unusual resistance to wide variations in temperature. Armstrong's Whitall Tatum Insulators are best for reducing your maintenance expenses.



**Time and Labor Saver.** The "Little Giant" Slack Puller is ideal for taking up and holding slack in spun messenger strand and cable before making cable repairs. A time-saver, it cuts insulation damage caused by working on tight cables. Made by CABLE SPINNING EQUIPMENT CO.



**No Snubbing or Rubbing.** Insulation damage can be greatly reduced with Reliable Drop Wire Clamps. Wedge-shaped, they grip twisted or parallel drop wire tightly, and permit free swinging; place all wear on clamps and eliminate sharp bends. Another dependable item in the RELIABLE ELECTRIC CO. line.

**No More High Resistance Joints** and intermittent open-and-closed circuits, when you use KESTER SOLDER CO.'s Rosin-Core Solder! It seals joints permanently, protects them against service troubles. Used by Kellogg and many other leading manufacturers of communication equipment.

**UARANTEED QUALITY • NATION-WIDE DISTRIBUTION • EASIER ORDERING**

## The Satisfaction Lasts When You Buy Products

# Recommended and Guaranteed by KELLOGG

**The Wire That Never Gives Up.** COPPERWELD Line Wire has the strength and permanence to stand up under any weather. Its unique construction—a thick covering of copper permanently molten welded to a high-strength alloy steel core—combines the high conductivity and rust resistance of copper with the strength of steel. Ideal for long spans.

**Dependable—in Any Weather!** Hemingray Insulators defy rain, snow and sleet. They stand on guard through the hottest summer days and the coldest winter nights. Products of OWENS-ILLINOIS GLASS COMPANY, many of these famous insulators are still giving dependable service after 20, 30—and even 50 years. Every lot is tested hourly with precision instruments.

There's three-way satisfaction when you concentrate purchases of line supply and construction materials at a single, responsible source: (1) The *quality* is right—all products are backed by the famous Kellogg DOUBLE GUARANTEE; (2) The service is right—orders are intelligently handled by experienced people; (3) *Delivery* is right—orders are shipped from the nearest of over 50 strategically located distribution points.

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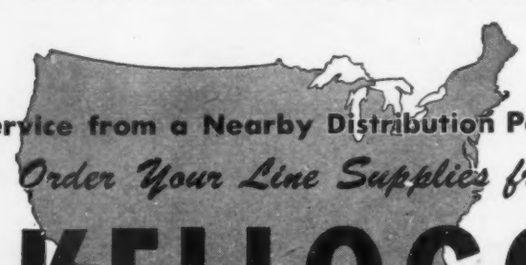

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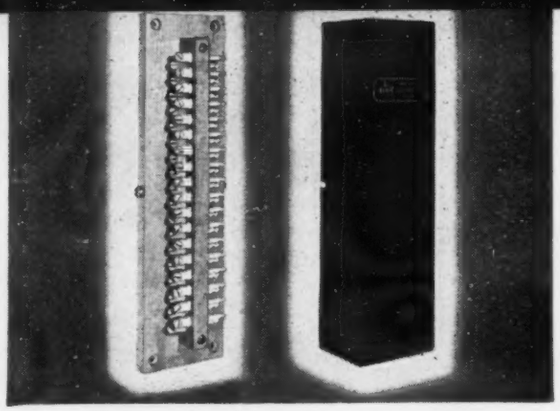
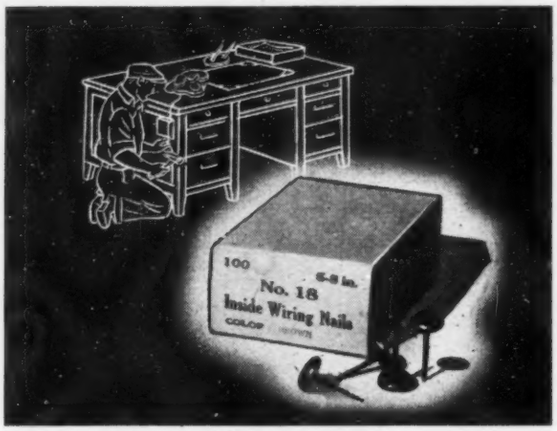
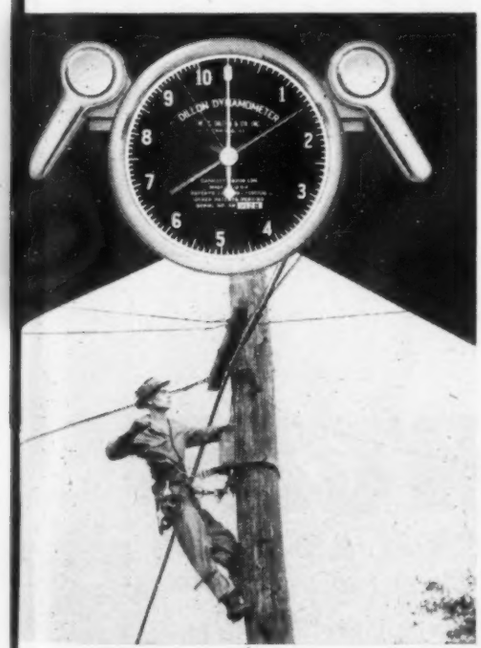


**The Practical, Economical Way** of providing screw connections for wire distribution in P.B.X. units and small unattended exchanges is with the Cook Type 54 Interior Junction Box. This COOK ELECTRIC CO. unit is also used for floor cable distribution in factories, offices, stores.




**It's a Snap** to make neat installations with Rhodes Telephone Wiring Nails according to telephone men who use them exclusively. M. M. RHODES & SONS maintain the uniform high quality of these nails by putting them through rigid driving, withdrawing, bending and immersion tests.

**Simplify Guying and Save Guy Strand!** Chance Thimbleye Guying Fixtures represent a sure way to successfully accomplish both. The curvature of the eye prevents kinking and breaking of strands, and helps make it easier to pull up and tighten guys. Chance Thimbleye Guying Fixtures . . . versus the old "wrap-around" method . . . save several feet of strand. Product of A. B. CHANCE COMPANY.

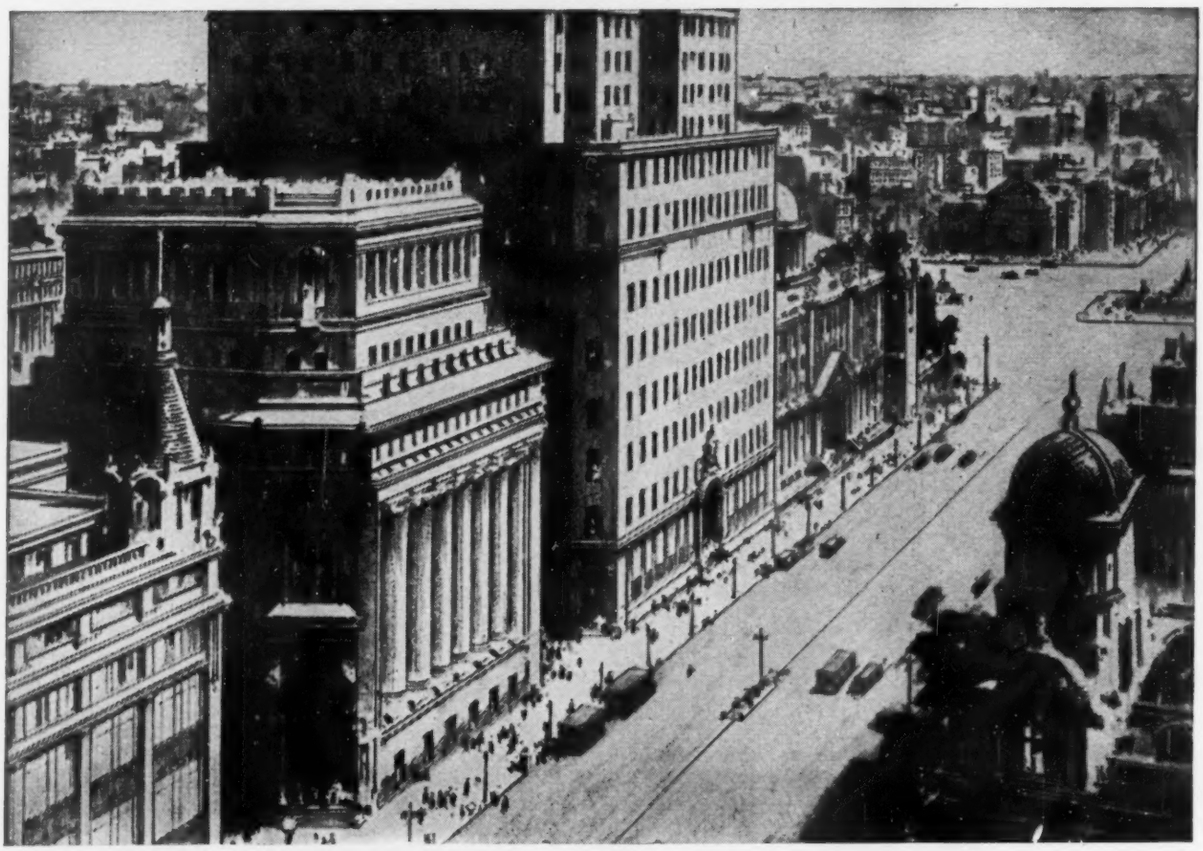



**Eliminate All Guesswork** on wire tension. The W. C. DILLON & CO. Dynamometer registers, *in pounds*, the exact load in wire, messenger or guy strand. It helps prevent overstrain and subsequent devitalized wires; provides good insurance against service failures caused by wind, sleet and snow.

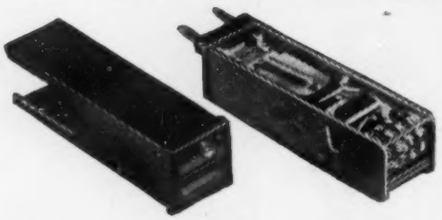
**Telephone Service Expansion** calls for increased battery capacity to insure against service interruptions. In specifying this equipment, many telephone engineers are selecting PHILCO Floté Storage Batteries, which eliminate low cells in modern full float service, materially reduce operating costs, and increase battery life.

**Not a Kink in a Carload.** Kellogg Koiled Kords always stay out of the way and thus help reduce telephone breakage caused by dangling cords. The outer rubber cover is permanently molded in spiral shape, thus assuring natural, uniform retractability. This is an exclusive KELLOGG product

# LINK THE WORLD'S RESOURCES - - -



# IN THE CENTRES OF COMMERCE - - -



## THE STROWGER METER

- *Every meter is operated on test 10,000 times at the rate of 5 operations per second before leaving the factory.*
- *Meters selected from stock have performed 300,000 operations on "life test."*
- *The reverse drive principle is employed, making possible more uniform adjustment.*
- *Rachet wheels are made of tin alloy.*
- *Resistance of the coil is within ± 5 % of the required value.*
- *Insulation resistance is 100 megohms at 500 volts D.C.*
- *Any type of winding to suit any particular purpose can be provided.*
- *Meters can be supplied with contacts for controlling external circuits.*
- *Meters can be used for recording subscriber's calls, traffic flow through exchange equipment, etc.*

There are many towns whose vast activities are those of the bazaar; they are the "market-places" of the world. As a result of transactions concluded there a buyer located five hundred miles to the north may obtain articles manufactured three hundred miles to the south. The season's crop of a whole agricultural area or the steel output of a city may be bought or sold overnight. Reliable means of communication must be available at all times. Strowger Automatic Telephone Service fulfills this need. In addition to its efficiency in operation it is simple to maintain, capable of extension to cater for growing populations and economical to both operating organisations and users.

*with*

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## TELECOMMUNICATIONS

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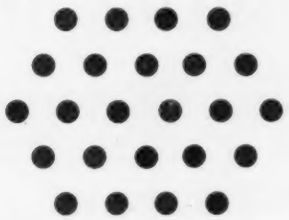
TEMple Bar 9262
STROWGER WORKS, LIVERPOOL 7, ENGLAND

A7091-B2

# PICTURE OF A *HEADACHE*



The dots on the left and on the right respectively represent the proportionate number of toll calls handled in the average American city just a few years ago, and today. It is evident that the problem of handling this ever-growing volume of toll traffic has become a real "headache." The Calculagraph helps very substantially by gathering the data necessary for billing purposes. For over half a century, telephone companies throughout the world have been well served by the accurate, simple-to-operate, durable Calculagraph. Today, the Calculagraph has met the test of unusual times; and that is why it continues to be the *standard* instrument for recording the starting and elapsed time of toll calls. The appearance of the switchboard model Calculagraph is familiar to almost everyone connected with the telephone industry. On this page we show a model possibly less familiar. It is finding increasing popularity in other fields — for timing piece-work in manufacturing plants, for personnel time cards in office and factory. We appreciate the heartiness of the telephone industry's endorsement of our product which has made this expansion possible. We can demonstrate our appreciation in the only way we know—by supplying you with the same fine machines that have served you so well for so long.

**CALCULAGRAPH COMPANY**

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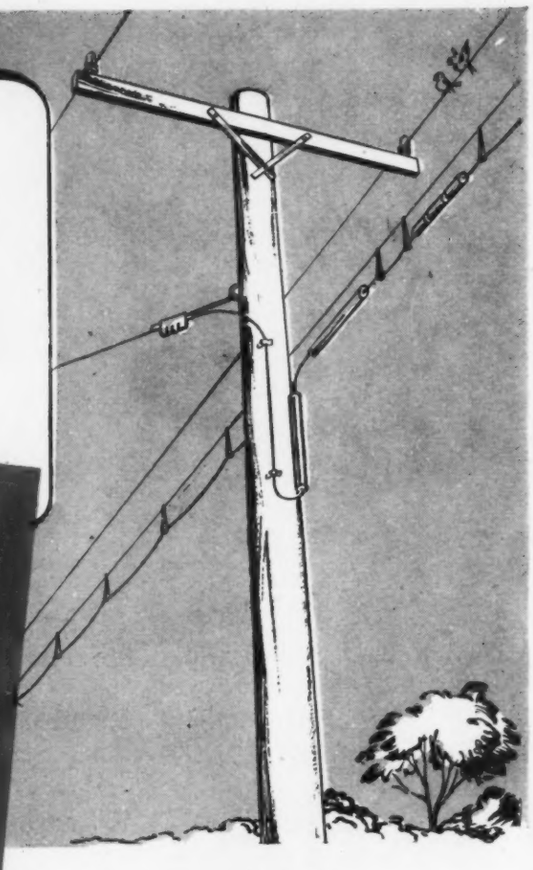
# Greater protection for drop wire with

## DURABLE, WEATHER RESISTANT NEOPRENE



**A SHEATH OF NEOPRENE RESISTS...**

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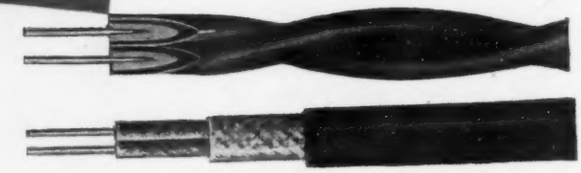

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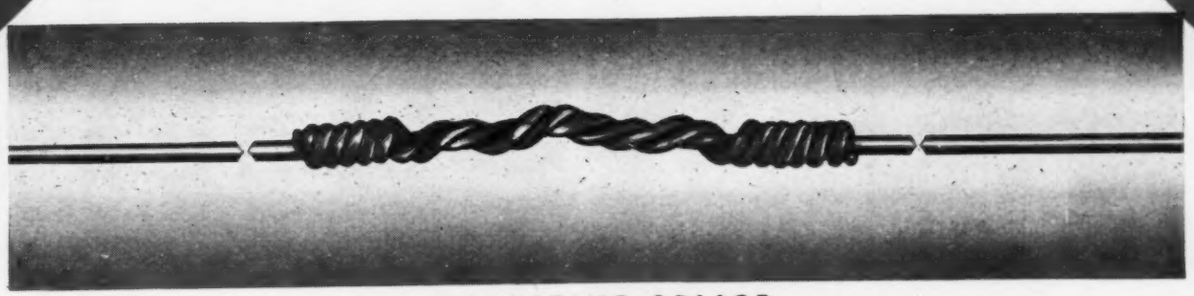
**eliminate the need of using a section of wire and two sleeves when old defective splices are being replaced.**



DEFECTIVE SPLICE

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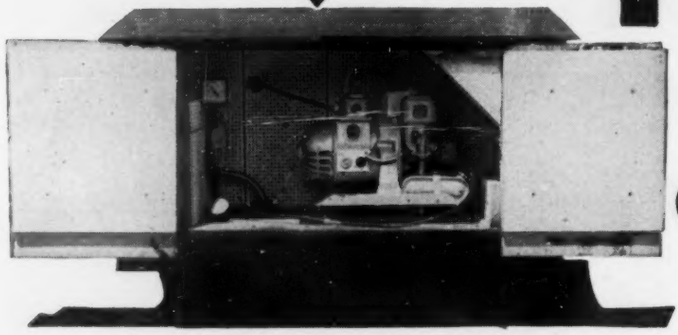
## Have Portable Practical Standby

# POWER



Homelite Portable Generator mounted in sound-proof box. Generator can be removed and taken to other locations.

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When your normal power supply fails . . . due to storms or other causes . . . put your Homelite Portable Generators into action and you'll keep your central exchanges and relay stations in operation. Light, compact and *portable* . . . easily and quickly carried to remote and inaccessible locations or to any of your exchanges or stations . . . Homelite Generators are the most practical means of providing standby power for communication or signal systems.

A complete line of these generators . . . both D.C. and A.C. . . . is available.

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Every wire in your Bethlehem strand has a smooth, highly ductile coating of zinc—applied by the bethanizing process. A cross-section, magnified, would look like two concentric circles.

**There's an old saying, "Alike as two peas in a pod." But it isn't really a good comparison, for two peas are seldom identical twins. It would be much more accurate to say, "Alike as two pieces of Bethlehem Strand."**

**The uniformity of our strand is something we like to talk about. When you purchase Bethlehem Strand of a certain grade and construction . . . then duplicate your order next week or next month . . . you're going to find the same high quality in both lots. The same easy-handling characteristics. The same high standard of workmanship.**

**And the coating will be uniform, too. For Bethlehem Strand has a bethanized coating—an armor of very pure zinc applied electrolytically. No thin spots here and thick spots there. *Uniform* thickness. *Uniform* protection.**

**Remember, also, that the bethanized coating is available in A, B, and C weights to meet different corrosive conditions. Regardless of the weight, you'll find the coating so ductile that it will virtually eliminate flaking, peeling, and checking.**

**More details? We'll gladly furnish all you want.**

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# BETHANIZED STRAND

# METROPOLIS ILLINOIS

***Another of the More Than 1000 American Cities and Towns for which Telephone Directories are Published by General Telephone Directory Company.***

Strategically located on high ground along the banks of the Ohio River stands old Fort Massac. This Fort, built by the French and named in honor of the Marquis de Massac, Minister of Marine, was turned over to Britain at the end of the French and Indian War. The English, however, failed to garrison it so General George Rogers Clark and his "Long Knives" paused here to rest on their way to capture Fort Kaskaskia in 1778. It was then that the flag of the new Nation was first unfurled in Illinois Territory.

Sixty-one years after the hoisting of the stars and stripes in Illinois, William McBane and James H. G. Wilcox laid out the city of Metropolis adjacent to Fort Massac.

Today the old Fort is a State Park and Metropolis has grown to be a rich industrial and agricultural center of 10,000 population.

For 10 years now, the Illinois Commercial Telephone Company which serves the Metropolis area, has employed the complete directory publishing service of General Telephone Directory Company. During this time the Metropolis Telephone Directory has produced 1160% more revenue from Directory advertising for the Telephone Company and at the same time they have been relieved of the time-consuming details of Directory publication.

If you have in mind the modernization and improvement of your Telephone Directory publishing procedure, we would like the opportunity of discussing our service with you. We would like to show you how you can make more money from your telephone directory.

Henry P. Worth joined our Publishing Department at Crawfordsville, Indiana, in November, 1945, after serving for 3 years in the Army. He spent 19 months in Italy, and participated in the invasion of Southern France. He served for 4 months in Trinidad with the Air Transport Command.

## GENERAL TELEPHONE DIRECTORY COMPANY

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# EDITORIAL

## *Warning!*

IN his address to the October national convention Col. Wm. C. Henry, retiring President of United States Independent Telephone Association, issued a word of warning regarding the future of small Independent telephone companies. It is his belief, said Colonel Henry, that "——within the next 10 years more than half of our present Class C, D and smaller telephone companies must of necessity disappear as separate local companies." These small companies, said Colonel Henry:

> "——must join together with a number of other small companies to form an efficient telephone operating unit of sufficient size to be able to afford competent management and justify the employment of trained maintenance employees, or they must be taken over by or merged with some larger Independent operating company."

Furthermore, says Colonel Henry, if the smaller Independent companies fail to take the steps necessary to raise their standards of service, a considerable number of these companies will be subjected to the reaction of aroused communities which will in a short time get out of hand and make these companies distress situations. He adds:

> "The past history of almost every one of these distress situations is that pressure from the public and state regulatory bodies has resulted in the Associated Bell telephone company in the area taking them over. The trend is already apparent in this first postwar year, and it will be accelerated in future years."

Colonel Henry's thinking on this subject is not entirely new in the telephone field; many thoughtful Independent telephone people have been concerned about this situation for several years. But the fact that Col. Henry has had the courage to voice his opinions on the matter publicly should be helpful to Independent telephony. To be forewarned is to be forearmed.

What the outcome of Colonel Henry's prediction could mean to Independent telephony is something for Independent telephone people to think about. Of the some 12,000 Independent telephone exchanges in this country, around 8,500 are owned and operated by telephone companies smaller than Class B companies—that is, by the Class C, D and smaller companies named by Colonel Henry. The disappearance, as separate companies, of half or more than half of these exchanges would result in a profound difference in the makeup of the Independent telephone group.

Nothing can be gained by blinking at the fact that many of these small exchanges—especially the very small exchanges—have not in even normal times in the past supplied the grade of telephone service the public has desired and for which that public would, in our opinion, pay adequate rates if the small telephone company would do the things necessary to obtain and justify such rates.

As Colonel Henry says, sincere praise and credit is due these small Independent companies for the part they have played in the formative period of telephony, by supplying telephone service in many localities that would have been without it otherwise. It would be a blow to Independent telephony to have a large number of these small companies pass entirely out of the Independent group. There must surely be ways by which this can be prevented, and by which small companies needing help of any kind—money, management or other—can be provided such help from within the ranks of Independent telephony. We do not know of anything more important to Independent telephony that could be undertaken and done by the national and the state associations, than this.

One of these ways is the grouping of a number of small exchanges into one company of sufficient size to be fully economic. One is, of course, the merging of the small exchange with a larger Independent company. Another way could be the contractual grouping of several contiguous small exchanges, although continuing under separate ownership, into one managerial unit. Perhaps there are other ways.

But, whatever way is used, it must be used with the knowledge that the telephone business has grown up—service, in even the smallest town, must be good.

# 2050 Is a Good Number!

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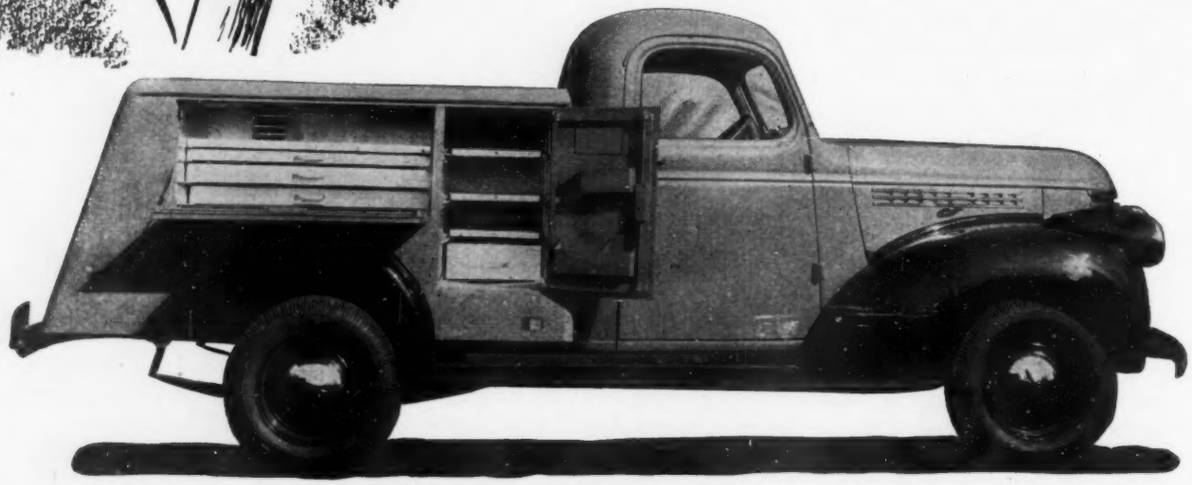
*Light Service Body*

MODEL 2050

**SAVES TIME, MONEY and INCREASES EFFICIENCY**



*Three Reasons Why*

**DESIGN . . .** compact and convenient with specific compartments for correct tools, parts, and materials for efficient service work.

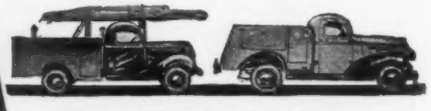
**ADAPTABILITY . . .** bodies can be serviced and remounted from one conventional ½ ton chassis to another.

**CONSTRUCTION . . .** all-metal construction with reduced body weight provides "take it" ability that assures constant trouble-free operation.

***Be "Body-Wise" . . . Consult US.***

**BODY DIVISION**

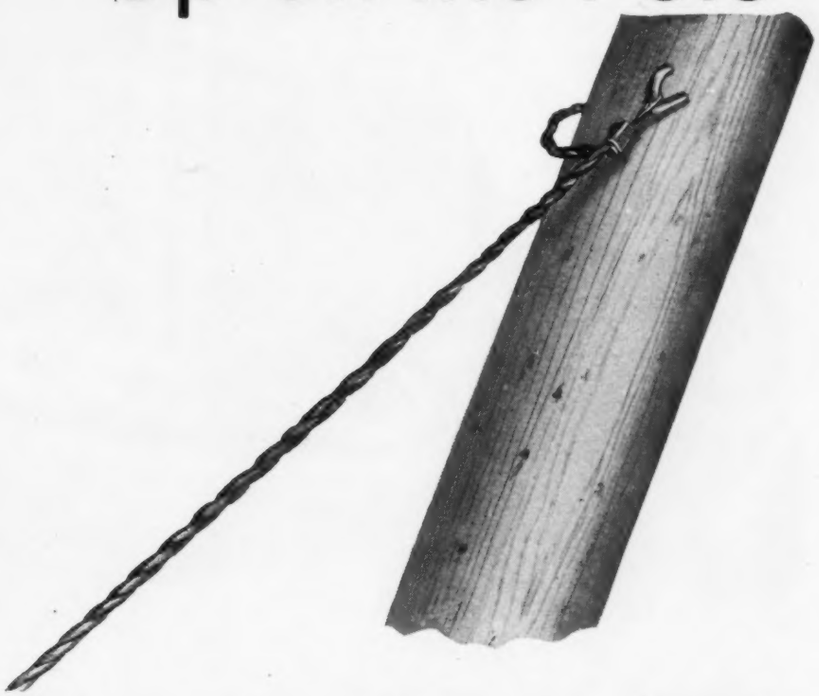
**YORK-HOOVER CORPORATION**



**YORK, PENNSYLVANIA**

Right

# Up on the Pole



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**Up there on the pole, battling the wind and weather, Monotype Drop Wire proves its worth. It's built *right*, because it's built specifically for the job, by experts who make almost every type of wire and choose Monotype construction as best for telephone distribution. From the conductor itself, to the slick-smooth mica-fortified coating, every step in its construction builds up to the finest wire for its purpose.**

**When you *must* buy drop wire, be sure you get Monotype quality. And please order well in advance of anticipated requirements.**

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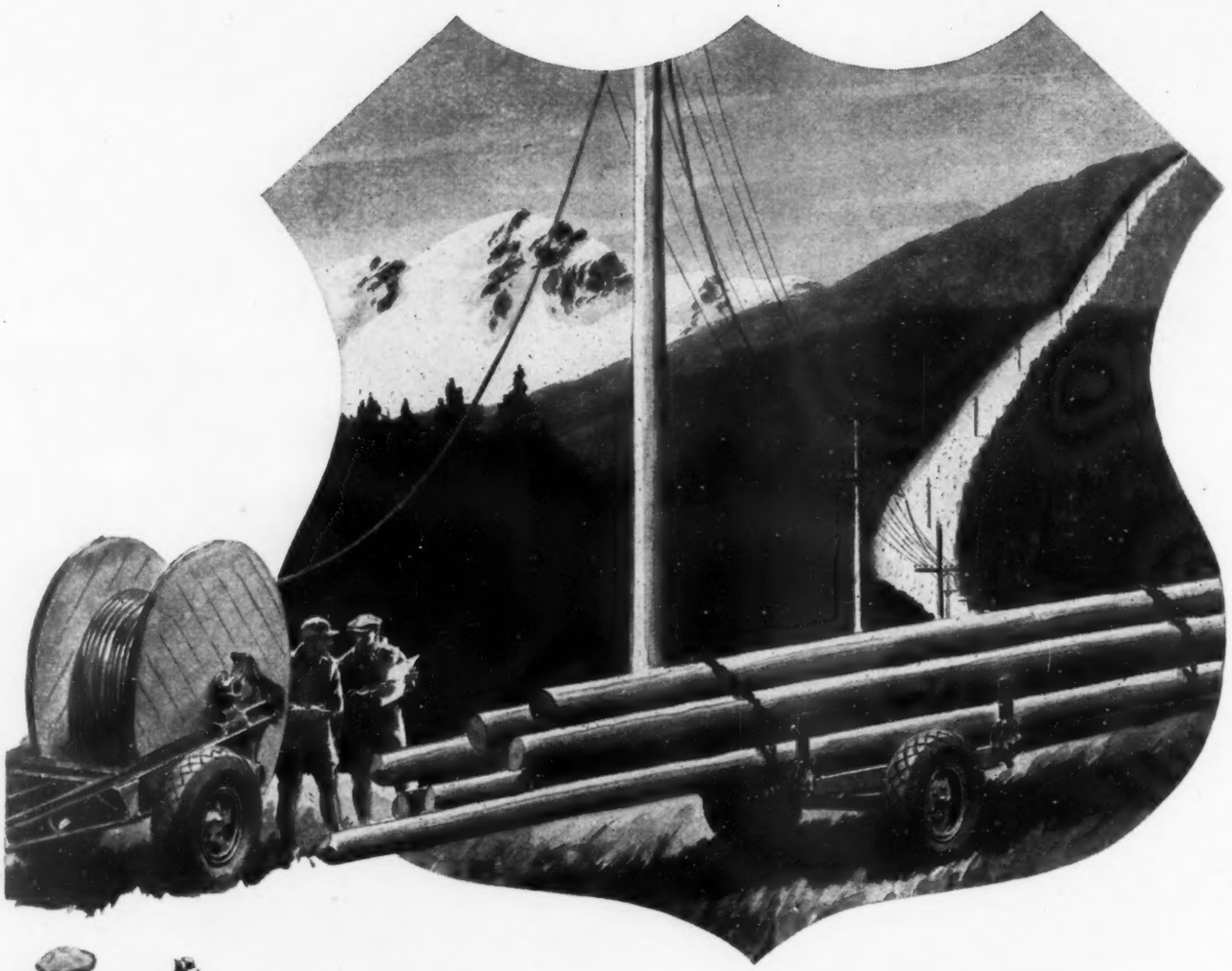

# When the line goes over a mountain HIGHWAY EQUIPMENT goes, too

Highway Pole Trailers, Cable Reel Trailers, and Splicer's Trailers are ruggedly built to go wherever the line must go. Whether it's along a highway, across bottom lands, or over a mountain, these efficiently engineered, labor-saving vehicles move in and help make the job easier for all concerned.

They all travel behind other vehicles that are needed on the job —the Pole Trailer, for instance, may be hauled by the light truck which carries the Highway Earth Boring Machine and Derrick. Either or both the others will ride easily behind a Highway Construction or Maintenance Truck.

Before you order any new equipment, it will pay you to get full information on Highway Line Construction and Maintenance Bodies, Earth Boring Machines, Winches and Power Take-Offs.

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*General Offices:* **EDGERTON, WISCONSIN, U.S.A.**

# NEWS BRIEFS

## REA Approves Loans In Four States

The Department of Agriculture has announced that the Rural Electrification Administration has approved loans totaling $970,000 to four rural electric cooperatives in four states. The funds will be used to finance rural electric facilities, including 443 miles of rural distribution lines to serve 1,302 farms and other rural consumers. Construction will start as soon as materials become available.

◆

## Newspaper Honors Indiana Independent

Headlining its story "Providence Company Marks 42 Years of Friendly Service to Area", the Franklin (Ind.) *Star* recently published a complete history of the Providence (Ind.) Telephone Company.

The paper stated the company was organized in 1901 to meet a definite community need. Since that time all corporation affairs have been directed toward providing the best possible telephone service to the Providence area at a minimum of cost.

◆

## Lincoln T. & T. Honors Retired Telephone Employees

Nearly 200 employees of The Lincoln (Nebr.) Telephone & Telegraph Company gathered at a reception held in Lincoln on September 28, in honor of 17 fellow employees who had retired from active service during the year. Following the evening program, high tribute and praise was accorded the honored guests for their many years of loyal and faithful service to the company by Frank H. Woods, chairman of the board of directors, Thomas C. Woods, president, and John H. Agee, vice president and general manager. Each retiring employee also received a certificate of service and an electric clock as an expression of esteem. Each clock was appropriately inscribed and indicated the number of years the employee had served the company.

**Among those at Lincoln T. & T. reception honoring 17 retired employees were John H. Agee, vice president and general manager; L. B. Stiner, director; Frank H. Woods, chairman of the board of directors; Thomas C. Woods, president; and 11 of the retiring employees. From left to right in the back row are: John H. Agee, Charles W. Albers, George Jones, L. B. Stiner, Frank H. Woods, Thomas C. Woods, W. H. Ames, A. E. Holt, and V. A. Randall; front row: Merrill Green, Erma Brown, Amelia Aden, Bertha Sharp, R. C. Parsons, and H. G. Schilling.**

Preceding the reception, those who were retiring were guests at a dinner given by the company's board of directors.

Retiring employees who were so honored were: Amelia Aden, Wilber, 40 years; C. W. Albers, Lincoln, 45 years; W. H. Ames, Lincoln, 32 years; Erma C. Brown, Sutton, 29 years; W. O. Bundy, Fairbury, 42 years; Maude C. Davis, Pickrell, 31 years; E. S. Fisher, Lincoln, 43 years; M. N. Green, Lincoln, 31 years; A. E. Holt, David City, 34 years; George T. Jones, Hebron, 32 years; R. C. Parsons, Lincoln, 27 years; V. A. Randall, Lincoln, 32 years; Michael Scanlon, Lincoln, 27 years; H. G. Schilling, Lincoln, 36 years; Bertha Sharp, Beatrice, 38 years; H. J. Soderholm, Lincoln, 29 years; and Jessie Wirthel, Cordova, 31 years.

◆

## Two Independents Win Awards for Reports

Singled out for honor by *Financial World*, two Independent telephone companies, Ohio Associated Telephone Company and Pennsylvania Telephone Corporation, were recently awarded Highest Merit Awards for financial reporting. In competition with many companies the financial reports of Ohio Associated and Pennsylvania corporation merited special consideration.

# THE STROMBERG-CARLSON DIA

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N DIAL . . .

IT embodies a precision and fine adjustment comparable to that of a costly timepiece.

It is built to withstand thousands of operations by scores of different hands daily throughout the years.

It evidences its quality by the attractiveness of its appearance, by the choice, the forming, the treatment, and even the careful finishing of its materials.

It is proof of the fact that no matter what the telephone product, *"There is Nothing Finer than a Stromberg-Carlson."*

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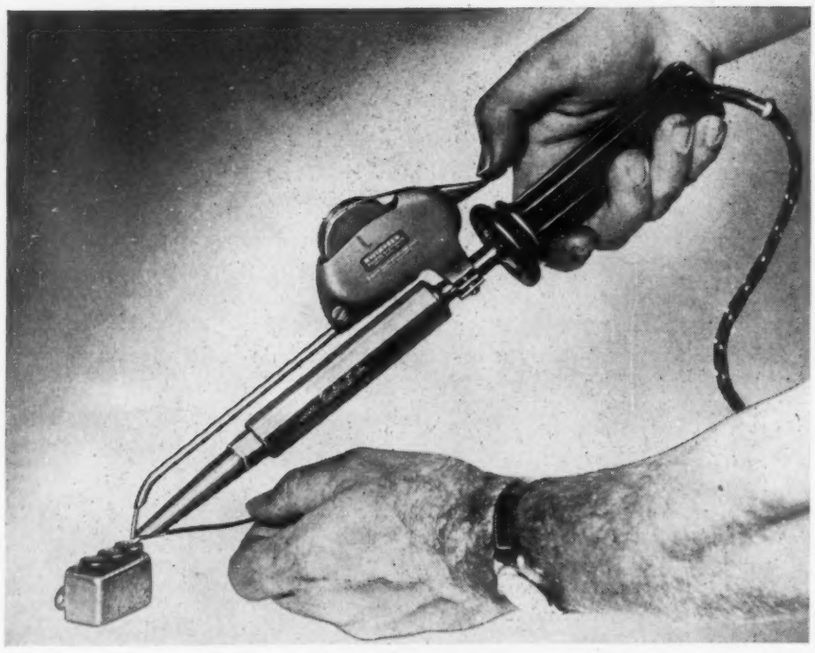


New KWIKFEED Solder Dispenser is operated by simple thumb or finger pressure of the hand holding the iron.

# THE ART OF SOLDERING

By
B. C. BURDEN,
Technical Consultant
Lincoln, Nebraska

### *General*

PROBABLY no other industry makes as much use of soldered joints as does the telephone field. Every telephone office has literally hundreds of thousands of soldered joints. For proper transmission performance, all joints in telephone circuits should have little or no electrical resistance. Joints should be mechanically sound and neat in appearance The art of proper soldering is not difficult to master. In fact it is one of the easiest jobs which the telephone workman is called upon to do. Many complaints of poor transmission or erratic signalling have been traced back to poorly soldered main frame connections. All new telephone workmen should be properly instructed in the operation of soldering.

Soldering consists essentially of joining two base metals together by means of a softer metal, which melts at a comparatively low temperature and which flows into the pores of the metal being bonded. The first and most important essential in the soldering operation is to remove grease, dirt and corrosion from the two surfaces to be soldered. The actual soldering operation will be greatly improved by the use of a *flux*.

### *Essential Elements of Good Soldering*

For telephone work involving electrical connections the flux used is usually of the rosin core type. The flux serves to destroy the oxide film which forms on metal surfaces. It also aids in the alloying action between the soft solder and the harder base metals. Rosin core solder, as every telephone man knows, is well suited to electrical soldered connections as it is non-corrosive and is a non-conductor. This is an important requirement as acid flux will corrode metals on which it is used. It is also objectionable as it creates a conducting film which offers a current leakage path between closely mounted terminals. In spite of the constant admonition against the use of acid core solder on telephone connections, there are still some workmen who use it in preference to the rosin type because it "solders easier". Acid core solder is of course useful in connection with certain types of outside telephone work as, for example, soldering two steel parts together where no electrical connections are involved.

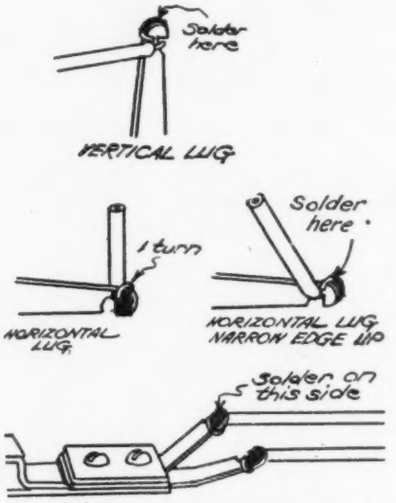
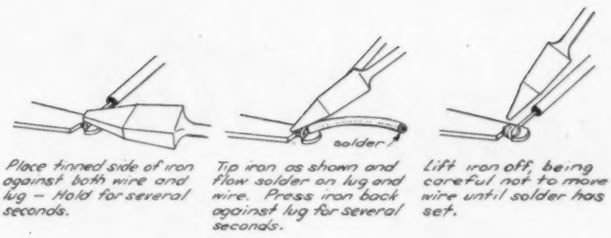



Fig. 1A—Terminal lug soldering methods.

### *The Soldering Process*

Successful soldering requires attention to the following items:




*Place tinned side of iron against both wire and lug — Hold for several seconds.* *Tip iron as shown and flow solder on lug and wire. Press iron back against lug for several seconds.* *Lift iron off, being careful not to move wire until solder has set.*

Fig. 1 — Several Steps in terminal lug soldering.

The TOOLHOLDER holds and guards the soldering tool when not in use. Rubber feet are provided so that it will not scratch or mar a highly polished surface.

(1) Clean the two parts to be soldered thoroughly by scraping or by means of a wire brush or emery paper depending on the nature of the work.

(2) The objects to be soldered should be placed in a secure mechanical relationship with respect to each other.

(3) A properly tinned soldering iron should be placed against the two metals to be soldered in such a manner that heat is conducted to both at about the same rate. The soldering iron face should have enough solder on it to permit the efficient conduction of heat from the hot iron to the metal surfaces. When the two objects are sufficiently hot (usually a matter of seconds), the iron should be tilted slightly, yet one edge still kept in contact with the work. Rosin core solder should be then inserted between the iron and the work. The amount of solder melted off by the iron should be just sufficient to flow evenly and bind the two surfaces together but not enough to cause a lumpy or sagging joint.

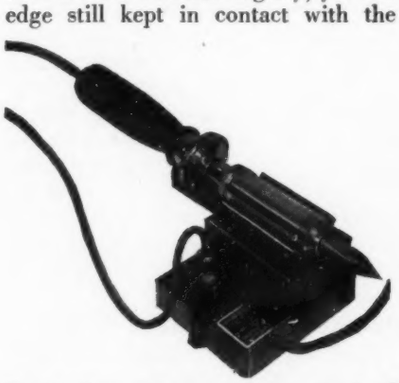


Fig. 3—Temperature regulating stand of American Electrical Heater Co. is a thermostatically controlled device for regulating temperature of electric soldering iron. When placed on and connected to this stand, iron may be maintained at working temperature or adjusted to low or warmer temperatures.

Fig. 2—Rheostat manufactured by Vulcan Electric Co. provides more flexible and accurate temperature control.

The iron must be of sufficient size to adequately heat the work, otherwise a "cold joint" will result. In a cold joint, the rosin has a tendency to insulate the wire and lug from each other. The result is a high resistance connection which is extremely difficult to locate because in many cases it has the appearance of a well soldered joint. Fig. 1 shows the several steps described above.

### *Solder Characteristics*

Solder is available in bar, wire and wire-flux core types. For practically all telephone purposes the rosin core type is recommended. The solder in common use consists of fifty percent tin and fifty percent lead. This soldering alloy will melt at approximately 414° F. A 40 percent tin and 60 percent lead combination will melt at 460° F. For electrical work, particularly the soldering of small connections, a solder consisting of 63% tin and 37% lead is popular. This alloy will melt at 353° F. and is very fluid and will set quickly.

Most soldering operations on relay racks, main distributing frames, switchboards, etc. are done with electric soldering irons. In exchanges where a number of jumpers must be changed or added to a main frame each day it is customary to keep an electric iron connected at all times. In such cases, however, the iron should be equipped with a thermostatic control to prevent it from becoming too hot. See Figures 2 and 3.

Fig. 4—Vulcan 24-inch electric soldering iron for resoldering connections in multiple switchboards.

Fig. 4A—Hexacon Soldering Iron.

### *Soldering Irons*

The Vulcan Electric Company makes a 24 inch electric soldering iron that has proven invaluable in resoldering connections in multiple switchboards. See Figure 4.

The most common type of electric iron in general use for telephone purposes is the 100 watt heating element type (See Fig. 5). This consists of a wire wound heating element enclosed in a steel barrel. A replaceable copper tip extends into the barrel. Irons of this type usually require from five to ten minutes to come up to soldering temperature. These are available in either screw

(Please turn to page 57)

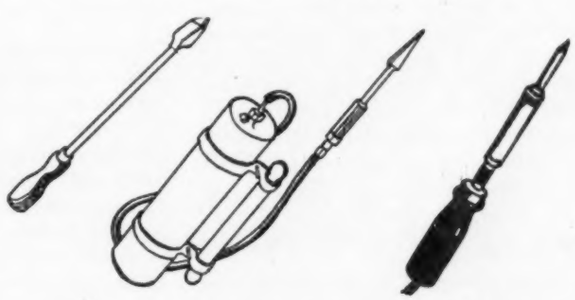



Fig. 5 — Typical soldering irons.

*Roland C. Davies*
Editor
Telecommunications Reports

# Our WASHINGTON BUREAU Reports

By
ROLAND C. DAVIES
and FRED HENCK

### *Rates*

**WASHINGTON observers have been generally heartened by the response of state commissions to the problems of the telephone industry in recent proceedings before the state regulatory bodies. In the Independent industry, of course, the state bodies bulk much larger than the FCC in consideration of the most pressing postwar problems—rate increases and improvement of service. And so far, at least, the state commissions have responded with judicial and thorough consideration of the industry's needs.**

In the moves of Southern Bell for rate boosts to bring its returns in line with steadily-increasing costs of materials and labor, the North Carolina commission was regarded as much impressed by the need of the company for rate relief, and the Georgia body can be relied upon to consider fairly the recently-filed application for increases there, based on its handling of its show-cause proceeding on postwar telephone service.

Washington sources haven't received too detailed reports of the moves by companies on the West Coast for rate relief and the statements that reductions will be sought by the state regulatory bodies in 11 Western states, but the news so far hasn't been particularly bad, even with the rate decrease threats. They aren't being taken too seriously at the moment, and it is quite likely that the commissioners there may find themselves faced with more applications for increases in a reversal of the situation.

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### *OPA Out*

**All to the good in the rate picture has been the demise of OPA, with its Public Utilities Branch on the rocks and the resignation of its Chief, Harry R. Booth. Although OPA Administrator Paul Porter had not yet approved the decontrol axe to chop off the utilities section as this was written, it was expected to go the way of most of the other price controls in the immediate future. Booth's departure followed closely that of Principal Attorney Howard Guttman, and while it was rumored that a remaining functionary might intervene in the Southern Bell Kentucky rate case to justify his continuation on the agency payroll, it was likely to have little effect on the proceeding.**

In what had been expected to be the Public Utilities Branch's final appearance in a rate case, that of the Southern Bell application in North Carolina, Mr. Guttman entered a motion for dismissal of the entire application. It was thought likely that instead of the whole case, the motion itself would be dismissed.

Booth, in a statement to the press immediately after his resignation, admitted that there exists little need for a stabilization program in the public utility field. Uilities rate increases are now entirely a matter of existing regulatory bodies, he declared, stating that the present machinery "is more than adequate to take care of the stabilization program." He praised the utility industry for its wartime cooperation in holding down rates.

### *Civilian Production Administration*

**Steps may soon be taken to impress upon the field offices of the Civilian Production Administration the essentiality of building construction for utilities, particularly telephone companies, following a number of instances of uncertainty by the CPA branches in handling the industry's applications, a highly-placed CPA source told a staff member of TELECOMMUNICATIONS REPORTS recently.**

Pointing out that many of the agency's branch offices do not understand the critical necessity for utility expansion, and that they are occasionally reluctant to approve large-scale projects because of their skimpy materials quotas, the spokesman said that some applications have been forwarded to Washington without action because the field managers have not known whether to approve or reject them.

Despite recognition by CPA of the urgent need of communications facilities expansion, the agency will "continue to be tough" in handling applications, the official emphasized. He declared that the shortage of building materials will not be alleviated for an indefinite period, but indicated that everything possible will be done to facilitate utilities construction "when the applications come to us stripped of all unnecessary design features."

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### *Pacific Radiotelephone*

The Army Air Forces' projected expansion of a major heavy bomber airfield in the same area as that selected by the Mutual Telephone Co. of Hawaii for its proposed transpacific radiotelephone stations appeared to throw serious obstacles in the path of the company's proposed entering the transoceanic radiotelephone field.

The sharply-contested hearing at FCC headquarters in Washington was on the application by the Mutual company to enter the field, not only between Hawaii and the U. S. mainland, but also to the Far East after cancellation of its contract with RCA Communications. RCA has operated the transmitting and receiving stations in Hawaii, corresponding with the A. T. & T. on the U. S. mainland, since 1931. Mutual has also applied for the RCA frequencies.

**Testimony of three high-ranking Air Forces officers that the antenna locations of the proposed Mutual stations**

**in the Barber's Point area would be a flight navigation hazard for the joint Army-Navy heavy bomber field in that section came as a surprise. The Army officers conceded that the War Department and Mutual might be able to arrive at some plan to iron out the difficulty.**

Indicative of the sharp RCA fight against the Mutual proposal was the declaration by its counsel that the international carrier would remain in the Hawaiian field in competition with Mutual, provided it received FCC sanction, if the Mutual application is granted. The RCA attorney, Glen McDaniel, said his company would invoke Section 201 of the Communications Act to require Mutual to interconnect with it to serve the Hawaiian transoceanic radiotelephone users.

The top executives of the Mutual company—president W. C. Avery and vice president J. Ballard Atherton—indicated that the challenge of RCA Communications to establish a competitive service was impractical and not feasible. If Mutual receives Commission approval, they said, the company then would be handling the transpacific radiotelephone service in all of Hawaii to and from the mainland and later to the Far East, and naturally would not divert traffic to the RCA stations. If the Commission denies Mutual's application, Mr. Avery said he would have to present the matter to his board of directors, but he felt the service would be continued, as under present arrangements, with RCA Communications performing the transoceanic radiotelephone operations.

### *One National Union*

**The leadership of the National Federation of Telephone Workers appeared confident as this was written that speedy membership ratification of the proposed one national union constitution is certain, and that a centralized union to replace the loose federation of semi-autonomous member organizations would be formed before the middle of November.**

The agenda for the union assembly in December, which began Nov. 4, calls for framing of the 1947 policy of national bargaining immediately after institution of the new union, probably to be known as the Communications Workers of America. Selection of issues to be bargained for immediately among the 23 "representative" working condition objectives determined at the Galveston Assembly last June will be high on the program, along with the wage goals for next year.

In another labor development, the Supreme Court has agreed to hear a test case to determine whether foremen are employees under the definitions of the National Labor Relations Act. The proceeding was filed by the Packard Motor Co., urging a ruling that foremen are not employees under the terms of the act, on appeal to a decision of a U. S. Circuit Court upholding a ruling of the NLRB that Packard must deal with a foremen's union. The Packard Co. cited the language of the act which defines "employer" as including "any person acting in the interest of the employer directly or indirectly."

## Convention Dates

**Alabama Telephone Association, Jefferson-Davis Hotel, Montgomery, November 18 and 19.**

**Missouri Telephone Association, Hotel Governor, Jefferson City, November 18 and 19.**

**Georgia Telephone Association, Henry Grady Hotel, Atlanta, November 21 and 22.**

**Florida Telephone Association, Marion Hotel, Ocala, November 25 and 26.**

**Nebraska Association, Lincoln Hotel, Lincoln, April 8 and 9, 1947.**

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### *Radiotelephone Expanding*

**Although the flood of applications for various types of radiotelephone service has subsided to some extent, a sizable number continues to be received by the FCC, and two significant grants were made by the Commission recently. The first was to a practicing physician in Maryland, believed to be the first individual user of the general mobile service. Another was the largest taxicab company grant yet made, to serve 1600 Yellow cabs in Los Angeles and San Francisco.**

Bell companies continue to dominate the list of telephone company applicants. Southwestern Bell, with approval already of its huge proposed highway system in Texas, has applied for 11 more land stations and 150 mobile units for urban and highway systems. Southern Bell also submitted another request for two land stations to work with 50 mobile units.

Meanwhile, the Galvin Manufacturing Co., one of the leading suppliers of radiotelephone apparatus to applicants, has itself asked for two additional experimental land stations to be set up at Chicago and Joliet, Ill. The stations will be used in conjunction with the company's extensive experimentation in the fields of urban and highway service.

### *FCC*

The proposal of the Southern Bell Telephone Co. to acquire the Milton Telephone Exchange, operating two exchanges at Milton and Jay, Fla., was detailed at an FCC hearing on the subject before Judge J. Fred Johnson as trial examiner. A. B. Dooley, Southern Bell Florida Manager, was the main witness, and he explained that his company had been asked by the regulatory commissions concerned to buy the property because Mrs. Betty Williams, present owner, has been unable to provide adequate service and maintenance of the property. A price of $31,500 has been agreed upon.

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## Commerce Group Seeks Automatic Installation

The Telephone Service Sub-Committee of the Sherman, Texas, Chamber of Commerce, has begun negotiations with the Texas Telephone Company looking toward installation of an automatic system for Sherman and a rate increase based on the cost of the new system. The company would construct a building and install the automatic equipment after proposing a rate based on the cost of the new equipment which will show their estimate of the expenditures required to make the conversion.

Under present plans an Independent telephone engineer will be hired by the city (with the company paying half his expenses up to $1,500) to prepare a similar analysis for the city.

Rates and the subject of a new franchise dependent upon these installations will then be considered by the city.

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## Radiotelephone Installed In Mexican Police Cars

The city of Matamoros, Mexico, last month inaugurated operations of its first radio patrol car and within the next few months it is expected to extend the installation of two-way radio equipment to all its police patrol cars. Eventually, the system will embrace the nearby community of El Control and other suburbs.

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## New Owners For Trussville, Ala., Company

Trussville, (Ala.) Telephone Company has been purchased by David M., Reuben S., Rufus H., and William T. Fields of Ashburn, Ga.

**Special Editorial Report**

# The Louisiana Rate Making Plan

*(EDITOR'S NOTE: With this publication of the following report on "The Louisiana Rate-Making Plan," TELEPHONE ENGINEER & MANAGEMENT inaugurates the publication, from time to time, of Special Editorial Reports on matters of importance to the telephone industry. These reports, based on careful factual study of and research on the matter, are prepared by our editorial staff after consultation with telephone people familiar with the subject and after advice, to the extent necessary, from legal, accounting, technical and other sources. Comment of an editorial nature in these Reports expresses the opinion of our editorial staff.*

*Special Editorial Reports will be prepared and published as often as matters arise which our editorial staff considers of sufficient importance to be so handled.)*

LATE in July the Louisiana Public Service Commission announced that it had officially adopted the "Prudent Investment" theory of rate making for public utilities under its regulatory jurisdiction. The Commission's first application of this theory was in a case fixing the electrical rates of Louisiana Power & Light Company. In its order in this case, issued July 29, 1946, the Louisiana commission explains in detail its reasons for and its methods of applying the theory of "Prudent Investment" in the determination of public utility rates.

Those reasons and methods are of interest to telephone companies; not only companies in the state of Louisiana, but also those elsewhere, since new theories and practices in utility regulation have a habit of spreading from one regulatory jurisdiction to others—particularly when the effect of such theories and practices is, as the effect of the Louisiana plan seems to be, to reduce utility rate making as nearly as possible to a fixed formula.

(The Louisiana commission is not bound by state statutes, as some state commissions are, to follow the "Fair Value" theory in utility rate making. But, since state statutes can be amended, present state laws cannot be expected to stand forever in the way of new theories of rate making, especially when such new theories are compatible with the decision, in January, 1944, of the U. S. Supreme Court in the Hope Natural Gas Company case. This decision held, in effect, that in the absence of state laws to the contrary, a state commission can determine the rate base and the rates by such method as it may choose, provided the end results are fair and reasonable.)

The difficult question in the determination of the rate base on the Prudent Investment theory has also been that of determining what is "prudent" investment in a property. The Louisiana commission settles that difficulty by taking original cost as the base, and by allowing as part of the total original cost, under certain conditions, the price paid for property purchased even when that price is in excess of the original cost of the purchased property. The rate base, arrived at in this manner, is defined by the Commission as follows:

> "The rate base to be used in determining a fair return shall be the total original cost of the property in useful service plus the allowable amount of Utility Plant Acquisition Adjustments

not amortized through charges to Operating Revenue Deductions plus a reasonable allowance for materials and supplies and for cash working capital, less the amount of capital secured from customers as contributions and construction advances."

As to any excess over original cost, the Commission says:

"Money is prudently invested, even though it is in excess of the original cost of the property purchased, if the excess of purchase price over original cost was paid as the result of arms length bargaining between non-associated buyer and seller, if the excess was necessary for the integration of the property into a larger and more efficient system, and if the purchase necessitating the excess did or reasonably should have resulted in public benefit by improvement of service to customers or in lowered rates or both better service and lowered rates."

The Commission then provides that any "excess of purchase price over original cost, termed in prescribed system of account as 'Utility Plant Acquisition Adjustments,' shall remain a part of the prudent investment during the life of the physical property to which it was applied, and its extinguishment from the investment, when and if required by the Commission, should be accomplished by amortization through annual charges to Operating Revenue Deductions during the life of the property remaining after the date of the purchase which created the excess."

Thus the rate base is original cost, plus any allowable excess over original cost, as such excess is defined in the foregoing. These costs used for the rate base are the undepreciated costs. The method of dealing with depreciation is described hereinafter.

We have these comments on this method of determining the rate base: The system will require an initial determination of the original cost of all the property included in the rate base, and of the allowable excess, if any, over original cost. This can be done, of course, by inventory of the property, priced on the basis of its original cost—a somewhat more difficult job than an inventory appraisal on the basis of reproduction cost new at the time of appraisal. At least theoretically, however, the original cost rate base will have to be determined only once, and it then becomes the foundation for the rate base for all time to come.

The original cost of the property will presumably be the amount set on the company's books as its plant account. The allowable excess will be stated on the books as "Plant Acquisition Adjustment Account." The original cost will thereafter change as additions are made to and retirements made from the plant.

To maintain the plant account with sufficient accuracy that it will at all times represent actual original cost, and thereby be suitable at all times for use as a rate base in rate cases, will require meticulous plant accounting—particularly as to retirements from plant.

Because of this necessity for meticulous plant accounting, we doubt if this system of determining the rate base will be practicable for application to the thousands of small Independent telephone companies, many of which, as is well known, do not or cannot maintain full-scale plant accounting, because they do not have, or feel that they do not have, the resources for doing so—including the maintenance of the considerable number of work orders and other original records of work done and things added to or retired from plant, upon which accurate full-scale plant accounting must be based.

In fact, it is difficult to see how this system can be practically applied to even the some 70 Independent exchanges in Louisiana alone, the largest of which has, according to our records, considerably fewer than 500 stations.

Also, this question arises: How long will the initial determination of original cost, plus even the best of bookkeeping thereafter, hold good as a rate base? Is it not possible that one side or the other —company or commission—will after some years become uncertain that the then plant account is truly representative of the original cost, and require—especially when rates are in question—a complete new study of the property on the original cost basis?

If this should happen often enough, it would offset all the savings of time, trouble and expense now necessitated by the making of appraisals on the "fair value" basis for rate cases.

One of the most difficult elements to deal with in a utility rate case is that of depreciation. This involves not only the question of the amount by which the property to be used as the rate base is depreciated, but also the question of the amount that should be allowed, as expense, for depreciation.

The Louisiana commission, having thrown overboard the "fair value" concept of determining the

rate base, lets the depreciation tail go with the hide and also abandons the method of determining depreciation that has always gone with the "fair value" concept of the rate base.

The Commission says, (and we agree with it) that "—much time and expense has been devoted to determining accrued or observed depreciation in past rate proceedings, and tremendous engineering and accounting efforts have sought to show that loss of service life is an evenly proceeding process and can be accounted for exactly and scientifically. It seems to us that this entire process, although theoretically desirable, is unrealistic, and is overstressed and is unduly complicated by too great a desire for mathematical exactness and certainty."

The Commission then reaches this conclusion:

> "It is our opinion that both the amount of the annual depreciation charge and the size of the depreciation reserve should be determined by the best judgement available based on consideration of all the factors involved but that both should be examined periodically by a consideration of all new facts and foreseeable changes in conditions and when the necessity for revisions are apparent, they should be made. The judgement of the management of each utility when properly supported by estimates of future conditions and records of past performance of depreciable property should be accorded considerable weight. Therefore, we propose to allow an annual depreciation allowance based on a fixed percentage of the cost of property, but with the understanding that this fixed percentage will be subject to revision when facts appear or are presented which would indicate the equitableness of such revision."

So much for the amount allowed, as expense and from earnings, to provide for depreciation. But how about the amount of depreciation that exists in the plant—the amount that is customarily deducted in rate cases from the reproduction cost new of the property under the "fair value" basis of determining the rate base?

To that, the Louisiana commission has this answer:

> "Legal title to the money collected by a utility from its customers to cover depreciation and set aside in a depreciation reserve is by authoritative jurisprudence held to be in the utility. However, the utility owner does not have unconditional unrestricted ownership and the contributing customers have an equitable interest in this reserve and some of the elements of the trust apply. Certainly the customer is entitled to have this money used for his benefit until such time as it is actually required to reimburse the owners for investment extinguished by retirement of property from useful service. The customer is entitled to receive whatever interest can be earned by judicious use of the money. This annual interest earned by the invested reserve should be applied as a deduction from allowable net operating revenue in computing the allowable return. The amount of this reduction of interest earned by this reserve is a question to be settled in each individual case by facts as to available uses for the money and other relevant evidence. The rate of interest to be applied will never be greater than the allowed rate of return, but may be less upon a showing by the utility that a lesser rate is justified."

Regarding this proposition of charging the company interest on its depreciation reserve, we have these comments: In the Louisiana Power rate case, the Commission, after allowing the company a 6% rate of return on its rate base as determined in the manner herein described, then deducted from the resulting allowable earnings, 5⅓% interest on the company's entire depreciation reserve applicable to its electric properties. This may have been a proper decision in the case of this particular company (we are not familiar with the details of the company's situation), but it would not, for several reasons, be a proper charge on that basis against the earnings of most telephone companies.

During the war the depreciation reserves of most telephone companies increased more rapidly than usual, since the reserve was credited with the customary accruals from earnings for depreciation, but the companies could not make the charges to the reserve they would have made in normal times, simply because they could not obtain the things they would ordinarily have put into plant to replace things they would ordinarily have retired. Also, during that period, they could not make normal extensions to or additional investments in plant. In consequence, they built up cash on hand or its equivalent (such as Government bonds) to an amount much larger than usual. A good part of this cash or equivalent is probably depreciation money, but it is *not* de-

preciation invested in plant, and it cannot be considered as earning money for the company as though it were invested in plant.

The point is that if the company must pay interest on any reserve for depreciation, that interest should apply only on that part of the reserve that has *actually* been invested in plant. As to the remainder of the reserve—the amount represented by cash or its equivalent on hand above the allowance for working capital, or by other investments—certainly the subscribers have no right to receive, in the determination of the company's allowable earnings, credit for more than the company actually receives as income on these items.

This situation can be illustrated more graphically by the following hypothetical case: Suppose the company segregated its entire depreciation reserve and invested the money in 2% Government bonds, then borrowed, on its own bonds, the money it used for additions to plant. Certainly no commission could argue that, in such a case, there should be taken into account in the company's earnings, more than the 2% interest actually received by the company.

The principle remains the same, whether or not the depreciation reserve, or any part of it, is actually segregated.

We have also this comment: The 5⅓% rate of interest charged on depreciation reserve in the Louisiana Power case seems to us to be too high. It looks, in fact, as though the Commission had fixed that rate just a little below the 6% rate of earnings allowed the company, in order to make the proposition seem eminently fair.

In our opinion, any interest charged on depreciation reserve invested in plant should be tied, as to the rate, with the rate of interest the company pays on long term money borrowed from other sources. In these times that rate would be below 5⅓% for practically any utility of size—in most cases considerably below. The Louisiana commission takes advantage of the prevailing low interest rates when it fixes the allowable net earnings of Louisiana Power as low as 6%; the Commission should in fairness give the company that same advantage when it fixes the rate of interest to be charged on the company's depreciation reserve.

Regarding rate of return, the Louisiana commission says the following:

> "The rate of return to be allowed shall be such a percentage of the rate base which will yield enough money after all reasonable operating expenses, maintenance, taxes, annual retirement or depreciation appropriations and amortization of Utility Plant Acquisition Adjustments have been paid or set aside, to pay bond interest and sufficient stock dividends to maintain the credit of the utility, attract new capital, reward good management and to enable the investor to recoup at any time the money he has prudently invested. The rate of return is a question to be determined in each individual case from evidence as to efficiency of the operation of the subject utility, market prices and ratio of earnings to market value of the stocks and bonds of similar enterprises operating under similar conditions, and any other relevant facts."

The manner in which the Louisiana commission applied, in the Louisiana Power case, the principles enunciated by the Commission, is, briefly, as follows: Rate base, earnings, etc., were based on an averaged year; the rate base, for instance, is the actual of June 30, 1946 and the estimated as of June 30, 1947, averaged. The base includes allowances for cash working capital (equivalent to approximately two months' expense), and for materials, and includes the unamortized allowable Plant Acquisition Adjustment account. From all this is deducted contributions and construction advances by customers, and amortization for one year, on a 15 year amortization schedule, of the Plant Acquisition Adjustment account. On the base so determined, the Commission allows the company an earning of 6% less 5⅓% on the company's depreciation reserve.

In the company's expenses—also for an averaged year—are included, in addition to operating expenses and taxes, a fixed-sum accrual for depreciation which comes to about 2.36% on the rate base, and the amount representing the one year of amortization of the Plant Acquisition Adjustment account.

The Commission concluded that the company's allowable net earnings for the averaged year were some $1,880,000 and that, at the rate the business was going, the company would actually earn some $2,300,000. It therefore concluded that the company was earning at a rate some $420,000 in excess of its allowable earnings and that "after considering the effect of income taxes, the elimination of this excess will necessitate a reduction of Respondent's rates and charges in the amount of approximately $700,000."

The significance of all the foregoing does not

lie, however, in the particular figures in this particular case, but in the fact that this system of rate making boils down simply to a formula by which the so-called "allowable" earnings of the utility are to be ascertained by the simple process of applying a few factors, to be determined by a commission, to figures on the company's own books. Given the allowable percentage rate of return, the allowable amount or percentage rate of the accruals for depreciation, the rate at which the Plant Adjustment Account, if any, is to be amortized, and the percentage rate of interest to be charged upon such part of the depreciation reserve as is invested in the plant and then, presumably, anybody familiar with the company's balance sheet and earnings statement can sit down and figure whether, at the end of any month, the company's rate of earnings is too high or too low according to the yardstick of the Commission.

Of course it is not quite as simple as that, since there are always factors, present or prospective, about a business that are not shown on its books of account—but it is, in essence, that long-time dream of many regulatory bodies, a rate making formula based on the books of the regulated utility.

There is nothing particularly new about all the elements of this plan. Stating of plant values on the basis of original cost, and the resulting Plant Acquisition Adjustment Account, and amortization of that account, have been the rule in a number of jurisdictions for some years. The idea of charging the utility interest on its depreciation reserve invested in plant is not new. Other elements of the plan have been used here and there. But, so far as we know, this is the first official adoption by any commission of all these elements together in one plan to create a full-fledged formula of this kind of rate making.

The basic philosophy of this system for rate making is stated by the Louisiana commission when it says, in the Louisiana Power Company order (the italics are in the order):

> Fundamentally, the 'Prudent Investment' theory was based on the two concepts that (1) the thing which is required to be protected in order to avoid confiscation under the constitution is the *money invested* in used and useful property and not the ever changing and illusory *value of the property* and (2) that so long as the investor is allowed to earn a rate of return which will attract purchasers for his interest and allow him to sell his interest and *recoup his money invested*, there will not be any Constitutional confiscation. Naturally, these concepts were based upon the assumptions that the public interest in the public utility business is of sufficient importance and that the economic necessity for actual freedom from wasteful competition in the public utility business is sufficiently well-founded as to justify the elimination of the possibility of capital gain by increase of the *value of the investment*. But the theory also assumes that the investment is made freely and without compulsion, so that if the investor desires to put his money into some other business where there is the probability of capital increase, so long as the rate of return available is sufficient to attract purchasers for his interest, he cannot claim confiscation."

The gist of this philosophy is that the owner of or investor in utility property should not expect his property or investment to increase in value beyond its original cost. If he wants an investment in which there is a chance of capital gain, he should get into some other kind of business. On the other hand, the original cost of his utility investment is presumed to be protected by the operation of a rate making plan which allows him to make a fair return on the investment.

The unfortunate part of the latter situation, from the standpoint of the investor, is that while a commission can allow the utility to make a certain rate of profit—if it can—no commission can guarantee the utility that it will actually make that much.

The plan seems to envisage frequent changes in rates for service—a natural concomitant of a system under which, presumably, it can be determined at the end of any month whether the net return of the company is at a rate the commission considers too high or the company considers too low.

Obviously, the Louisiana rate making plan is one of which telephone managements should take cognizance. Those interested in reading the order we have discussed and quoted from herein should obtain the Louisiana commission's Order No. 4346, Docket No. 4271.

We cannot refrain from quoting the comment of one telephone man whom we consulted in the preparation of this review. After long study of the order he said: "It looks like the aim is to fix it up so a clerk in a back room can figure out the rates for any utility. If the scheme works, where are all these Commission staffs going to get jobs?"

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# *Signal Association Welcomes Communication Men*

HAVING as its primary purpose—the safeguarding and strengthening of the national security of the United States, the newly formed Army Signal Association, 631 Pennsylvania Avenue, N. W., Washington, 4, D. C., is now welcoming into its membership all present and former members of the armed forces, and civilians who are American citizens and interested in objectives of the organization.

Major General H. C. Ingles, Chief Signal Officer of the Army, recently stated that the organization will do its utmost to keep "Our country in organized readiness to meet external aggression by quick mobilization of trained men, superior weapons and essential industries, integrated into an effective instrument of armed defense."

"To this end," Major General Ingles stated, "the Army Signal Association intends to preserve and foster the notable spirit of cooperation and good will which flourished during the war among the various branches of the Armed Forces and the personnel of industries —both manufacturing and operating— in the fields of communications, electronics, motion pictures and photography.

"This vast reservoir of good will and mutual understanding will be utilized to assure cooperative aims and efforts between scientists, inventors, engineers and manufacturers in civil life and personnel of the Regular Army, National Guard Organized Reserve and affiliated units concerned with communications preparedness."

Major General Ingles stated that one of the principle lessons learned from the recent war is that the security of our nation depends—in great measure—upon our maintaining a positive leadership in scientific research and their application to military problems.

A major objective of the new Association will be full encouragement of research and development programs undertaken by private, educational and research organizations in conjunction with laboratories of the Armed Forces in order that continuous study and integration may be assured.

Other objectives are to render practical and effective assistance in maintaining an efficient personnel—military and civilian—for the Army and to commemorate the wartime services of American science and industry.

Maj. Gen. H. C. Ingles

The Association is non-profit making and membership is open to present and former members of the Armed Forces, civilians who are American citizens, and to all firms, companies, associations, and groups controlled by American citizens.

The provisional constitution and By-Laws provide for the following classes of membership and dues:

(a) Life Membership—$50.00.

(b) Full Membership—$4.00 annually.

(c) Group Membership—$100.00 annually. Open to all firms, companies, and associations interested in promoting the cause of industrial preparedness, particularly in connection with research, development, operation, production, manufacture and supply of communication, electronic, motion picture and photographic equipment. Group members have the privilege of nominating five (5) of their officials or employees who are American citizens to be full members in the Association without dues. For each member in excess of five (5) nominated by a group member, the annual dues are $4.00.

(d) Student Membership—$2.00 annually. Open to all men and women who are students in technical courses in schools and colleges.

Members are entitled to the official publication of the Association, which will be published bi-monthly, and to such other publications as may be issued periodically.

It is planned to organize local chapters throughout the United States at places where there is a group large enough to organize and maintain such a chapter.

The Constitution will be subject to the approval of the membership and the officers and directors will be elected by letter ballot. To get the organization under way, provisional officers and a provisional board of directors who will serve only until the first election can be held have been appointed.

These interim officers are:

President—

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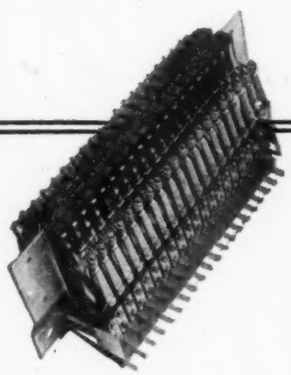
# GUESSWORK ELIMINATED

## In designing and testing Cook Protection Equipment



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Combines cable termination with protection of central office personnel and equipment against high potentials and sneak currents. In operation, it opens the switchboard circuit, grounds the outside line and operates an alarm circuit. Note these construction and operating features:

1. Provides for temporary disconnect.
2. Self-soldering, low-resistance heat coils easily reset after operation without changing, reversing or resoldering coils.
3. Line and switchboard connections on opposite sides of protectors.
4. Steel mounting plate for maximum strength.
5. Unit dischargers, consisting of two carbons, separated by acetate dielectric cemented together, permanently grounds the outside line under continuous discharge.
6. Easily tested without removing heat coil; withdrawal of test plug leaves protector in operating condition.

This AC-DC High-Voltage Generator of large current capacity, in the physics laboratory of Cook Electric Company, is used to study strength of dialectrics, effectiveness of discharger gap surfaces, current surge capacity of protector parts and conductors, and insulation characteristics.

These data are required in rating and designing, without guesswork, Cook sub-station, pole cable terminal and central office protectors, long the standards of dependability in the independent telephone industry.

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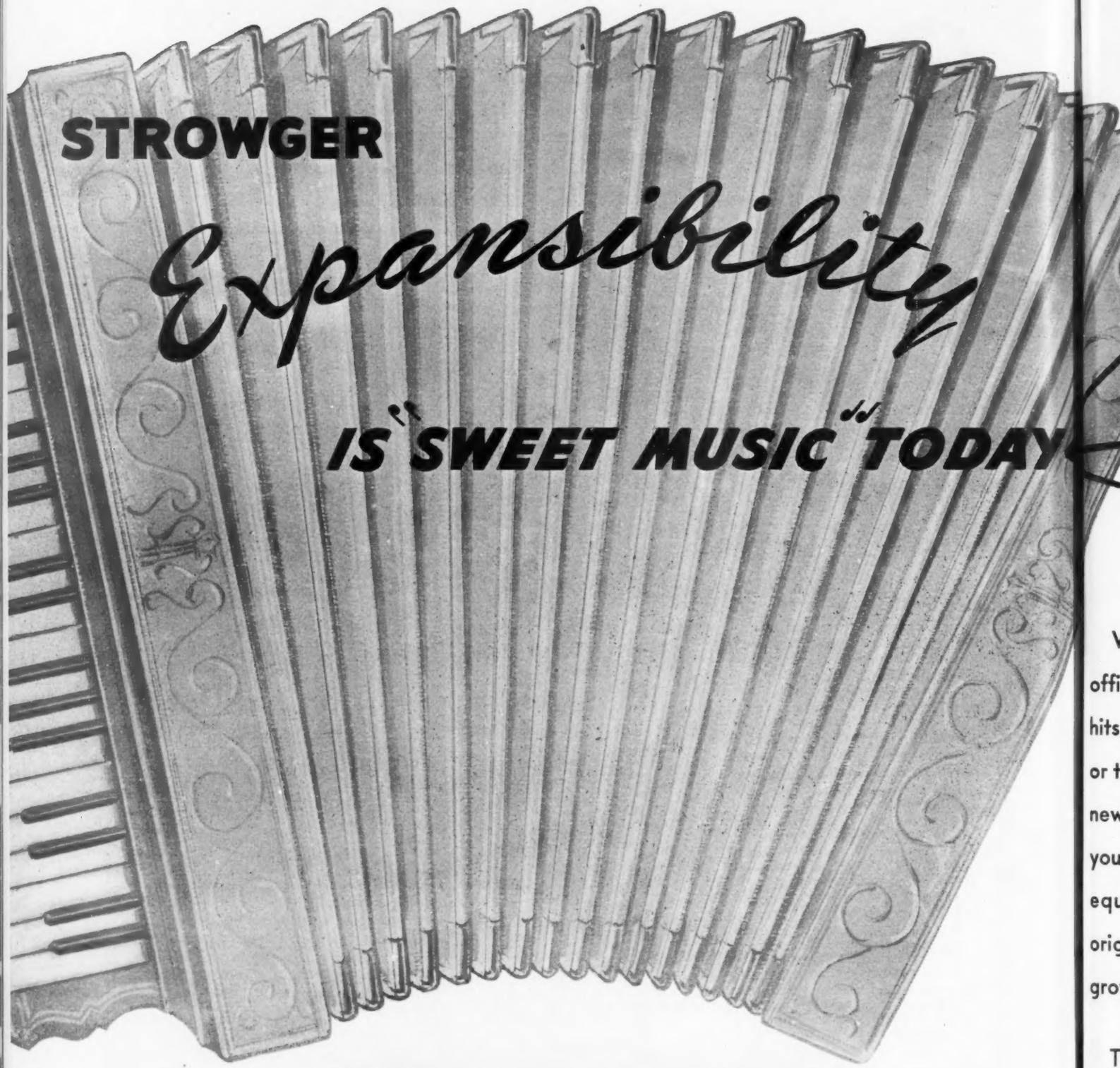


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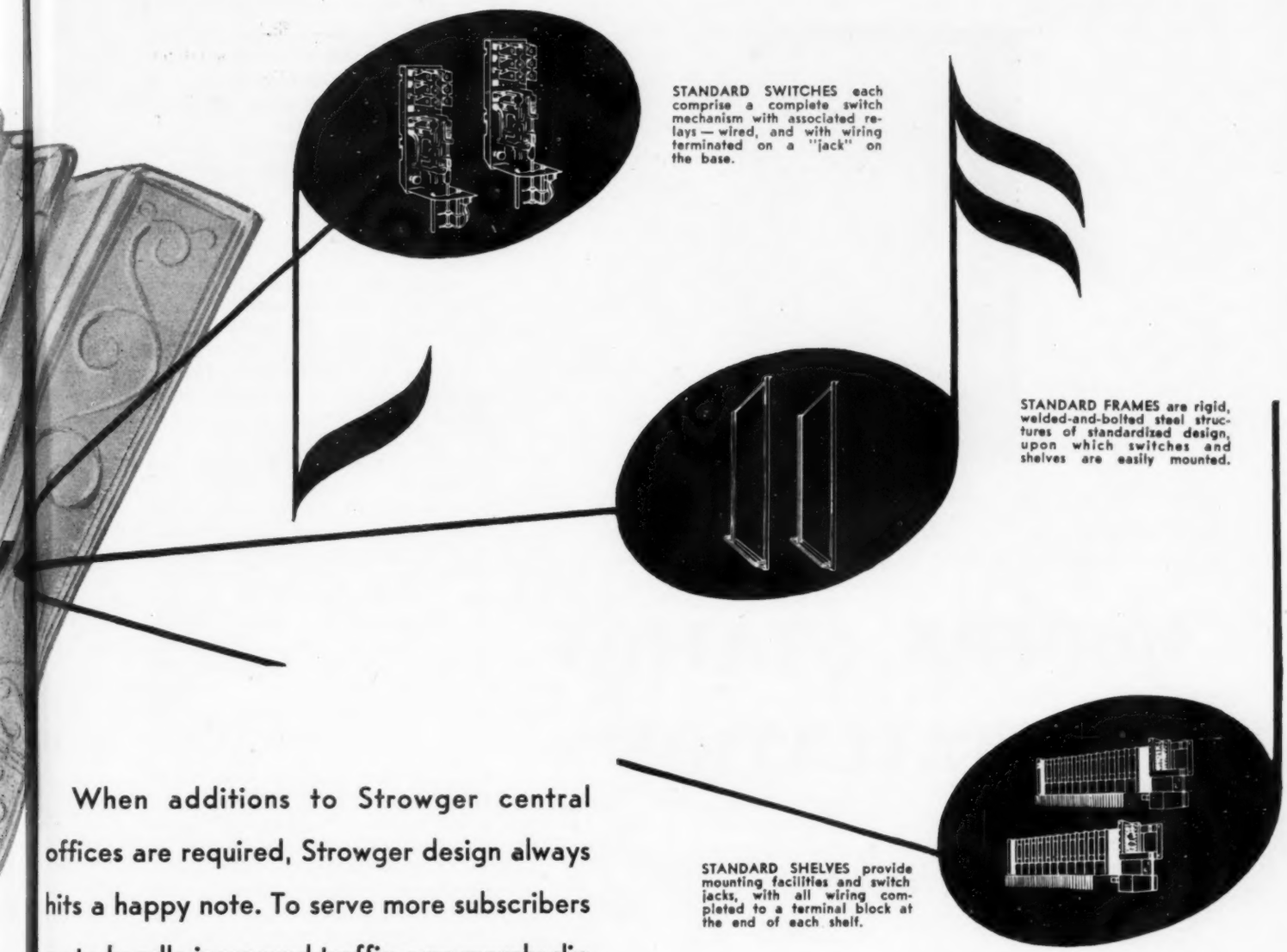

STANDARD SWITCHES each comprise a complete switch mechanism with associated relays — wired, and with wiring terminated on a "jack" on the base.

STANDARD FRAMES are rigid, welded-and-bolted steel structures of standardized design, upon which switches and shelves are easily mounted.

STANDARD SHELVES provide mounting facilities and switch jacks, with all wiring completed to a terminal block at the end of each shelf.

When additions to Strowger central offices are required, Strowger design always hits a happy note. To serve more subscribers or to handle increased traffic, you merely slip new switches into place. For further growth, you simply add new shelves or frames, with equipment as needed. In all cases, the original equipment remains unchanged—and growth takes place without "growing pains."

Today, this "step-by-step" expansibility is setting a new high in its value to telephone companies. With present unavoidable shortages of central office facilities, it provides savings in equipment and time—as well as in dollars—which make it a priceless boon for meeting urgent service needs.

Today, unforeseen expansion which, with less flexible equipment, would necessitate complete rebuilding of central offices, is being satisfied with a minimum number of Strowger switches, shelves and frames. Once again, Strowger design is giving convincing proof of its superiority—and demonstrating why most telephone companies "going automatic" specify "STROWGER Automatic."

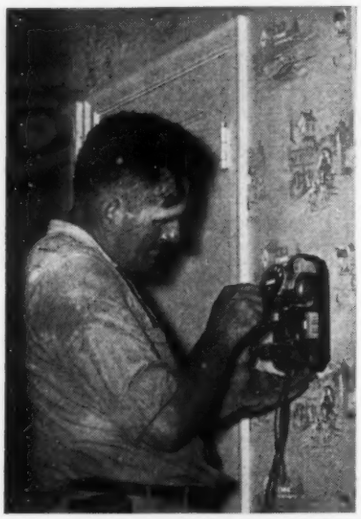

Fig. 14—Showing method of installing wall handset on partition in which inside wire has been concealed.

# MODERN STATION INSTALLATION

By

J. S. REED

*Part II. Part I appeared in September 15 issue of Telephone Engineer & Management.*

### *Protecting Inside Wire Runs*

To protect inside wire from damage it is advisable to maintain the proper separation of the wire from other kinds of wiring or from pipes as specified in Table No. 1.

One-quarter inch woven conduit, or loom, is satisfactory protection for inside wire and is adequate for three duplex wires or two triplex wires. Under certain conditions it may be desirable to cover the wire with two layers of friction tape rather than use loom. When the wire is run on the outside of a wall from the floor level, the hole in the floor should be bushed with a porcelain tube to protect the wire. In same cases, it may be advisable to use a short length of iron conduit for this purpose.

Care should be taken not to place inside wire in the same space between wall or partition studs with electric light or power circuits. The presence of these circuits is usually indicated by the location of a convenient outlet, switch, or light fixture on the wall.

### *Installing Exposed Wire Runs*

It is generally most economical and convenient to run inside wire on exposed surfaces. Such runs can be made more or less inconspicuous by using brown or olive-green wire on dark colored surfaces and ivory wire on light colored surfaces. It will be found that brown inside wire will harmonize with most colors especially on woodwork. Fasteners, of course should be of a color that harmonizes with the color of the wire.

Wiring that is placed on top of baseboards, picture mouldings, door or window trim will not be noticeable to the room occupants. If it is necessary to run the wire directly on the wall, corner or ceiling lines should be followed as much as possible.

Several types of fasteners are utilized for attaching inside wire runs to the supporting surface. Inside wiring nails are the most common type and are usually obtainable in brown and ivory color. Saddle tacks are also popular but are not so satisfactory from the standpoint of appearance. Special stapling machines are available for stapling the wire to the surface and can be used to advantage on extensive runs of inside wire. Inside wiring nails or saddle tacks should be driven with a small tack hammer to avoid crushing the wire insulation.

For runs in basements, shops, warehouses and the like, ½-inch or ⅝-inch drive rings are recommended for ease of installation. The installer only has to place a number of the drive rings approximately 4 feet apart on joists and girders as illustrated in Fig. 13 and then lay the wire in the rings, holding down each end of the run with wood cleats or wiring nails.

### *Concealing Wire Runs*

In the better residential districts it is desirable to conceal wire runs within walls of the living quarters of the house. Subscribers, being

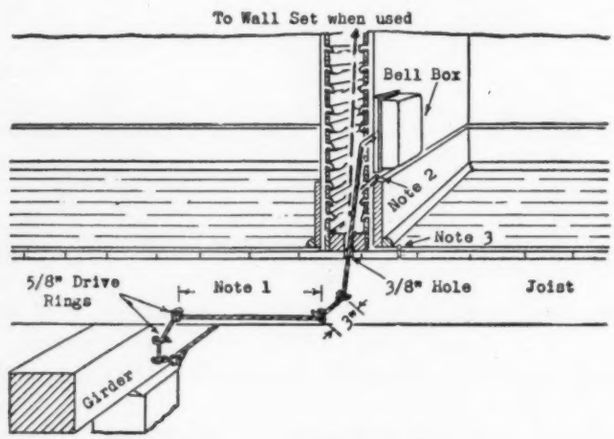


Fig. 13—Method of running wire in basement and concealing run in partition on floor above. Notes: (1). Maximum of 4 feet in horizontal runs and 8 feet in vertical runs; (2). If connecting block is to be used, bore hole in wall at edge of baseboard and mount connecting block on wall; (3). Bore ⅛-inch hole through floor.

Table No. 1—Minimum Required Clearances of Inside Wires and Inside Wiring Cable from Foreign Wires, Conduit, and Pipes.

| FROM NEAREST PART OF | CLEARANCES WHEN CROSSING | CLEARANCES WHEN PARALLELING |
|---|---|---|
| Knob and tube electric wiring | 2" (Note 1) | 2" |
| Signaling circuits (door bell and electric door lock | ½" | ½" |
| Electric conduit of all type (Rigid BX cable, non-metallic cable, etc.) | ½" | ½" |
| Radio antenna lead, ground wire, loudspeaker lead | 6" | 6" |
| Over water pipes: over and under uncovered steam pipes (Note 2) | ½" | ½" |
| Under water pipes | Note 3 | Do not parallel |

Notes:
(1) If there is any possibility of the wires coming together closer than 2 inches when crossing each other, protect the inside wire with loom.
(2) No protection is required for runs passing closer than ½ inch from covered steam pipes.
(3) If crossing under water pipe cannot be avoided, protect with loom regardless of amount of clearance; since water pipes tend to sweat and would drip moisture on the wire.

usually particular about the appearance of their rooms, are generally quite appreciative when the installer makes efforts to properly conceal the station wiring in locations other than the basement. Fig. 14 illustrates the neatness of a wall handset location achieved by running the station wire inside a partition wall.

Concealment of a wire run is usually a simple matter when the telephone is installed on the first floor level. The method of bringing the wire through the floor in a case of this kind is illustrated in Fig. 13.

A knowledge of building construction is quite important when it is desired to make a wire run to the second floor level of a building or higher. The following facts will be found helpful in determining where a wire run should be concealed:

(1) Houses of the so-called balloon frame construction have the space in the outer wall open from the basement to the attic except possibly for fire or draft stops. Platform frame constructed houses have floor places (soles) and ceiling plates (girts) closing off the wall space at floor levels.

(2) Partitions (interior walls) often have obstructions such as bridging in addition to the floor and ceiling plates. A partition on one floor may not always be in line with another on the upstairs floor, making it difficult to fish the wire from one floor to another. In such cases, it is preferable to run the wire in an outside wall rather than attempt to fish it from the basement to the second floor through a partition.

(3) Other kinds of obstructions that may be found within walls are rock or glass wool insulation, brick firestops above the foundation sill, draft stops, and concrete and wire netting.

(4) Many houses have diagonal braces let into the studs at the corners on each floor which may interfere with attempts to fish the wire through the wall space near such locations, though there is generally a narrow gap between the braces and the back of the plaster covering.

(5) Houses of solid brick construction usually have ⅞-inch open space between the back of the plaster covering and the brick wall from the basement on through the upper stories.

When a wire run is to be placed within walls, first determine where the instrument is to be located. Then make a survey of the premises to ascertain the best route for the inside wire, taking measurements (if necessary) to locate the point where the wire is to enter the wall from the lower floor. Sound the walls to locate obstructions such as studdings. If it is difficult to locate the place for boring into the wall from below, a small search hole may be drilled in the floor at the location of the instrument as shown in Fig. 13. A piece of wire inserted through the hole will then show where to bore the hole for the station wire. (Afterwards this hole should be plugged with beeswax or suitable filler.)

To bring the wire up through the floor, tie a short length of sash chain to a stout cord, such as lacing cord, and drop the chain through a hole made in the wall at the location of the wall instrument or bell box. Attach the free end of the cord to a hammer or suitable object to keep the cord from being pulled into the hole. Go down into the basement and pass a hooked length of iron wire through the hole in the floor. Manipulate this wire until it catches on the chain and then draw out the cord and chain. Fasten the cord to the inside wire and draw the cord

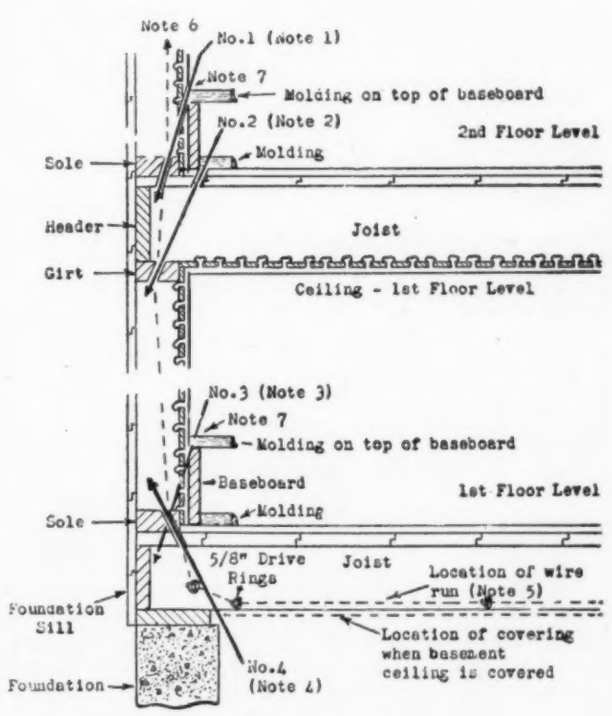


Fig. 15—Methods of boring through obstructions in outside wall. Notes: (1). Hole bored through wall covering and floor plate when baseboard has top molding. (2). Hole bored through ceiling plate. (3). Hole bored through floor plate when basement has covered ceiling. (4). Hole bored through floor and floor plate when basement ceiling not covered. (5). In basement with covered ceiling, bore hole in ceiling and run wire on ceiling in ½-inch drive rings. (6). Run wire to another floor or instrument mounted on wall. (7). Make groove in plaster when wire is to come out at baseboard.

and wire together back into the hole from the upstairs floor and out at the instrument end.

For wire runs from the basement to a second story level or higher, efforts should be made to use some other method that will not require placing the wire run inside a wall. Sometimes installing the run inside a cupboard extending from the floor to the ceiling will do the trick. Also it may be possible to install an outside protector at the second story level to bring the telephone lead directly into the house at this location.

If, however, it is found that the station wire must be run within the wall to the upper floor, holes may be bored at the location suggested

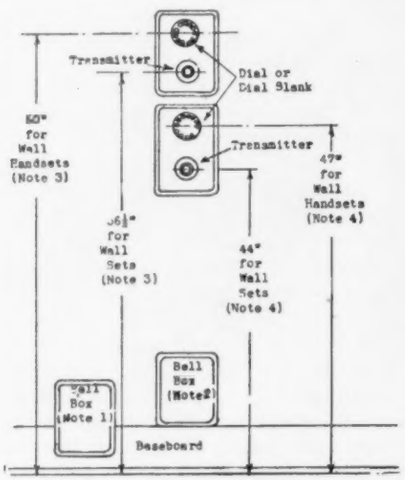


Fig. 16—Showing mounting heights of wall instruments on wall and proper locations for bell boxes. Notes: (1). Bell box on wood baseboard where wall is expensively finished or is composed of material too soft to properly hold the bell box without a backboard, or is of material difficult to drill into. (2). Bell box on walls to which it can be easily attached. (3). For subscriber in the standing position. (4). For subscriber in the sitting position.

in Fig. 15, using a long shank bit for this purpose. A regular electrician's fishing chain is best for dropping through the wall, though the cord and chain previously described will work quite well. A short length of stiff wire or an umbrella rib is handy for guiding the chain through the series of holes made through the floor and ceiling plates.

### *Installing Telephone Instruments*

Before proceeding with the installation of the telephone instrument, the installer ascertains the wishes of the subscriber as to the location of the instrument. However, there are certain locations that should be avoided on account of the possibility of inconvenience or even injury to the subscriber or damage to the instrument. The following are considered unsafe locations:

(1) In narrow hallways where there is a possibility that the instrument cord may be left stretched across the passageway as the result of the telephone stand being moved.

(2) Near doorways, stairs going down, or trap doors where the subscriber would have to guard against stumbling and falling in going to and from the instrument.

(3) Near piled up materials that would interfere with the use of the telephone.

(4) Close to electrical fixtures such as wall switches or convenience outlets, particularly in situations where telephone and power wires are exposed to frequent lightning disturbances, as in farm districts.

(5) Near grounded objects such as furnace registers, radiators, water pipes, and the like.

There are other locations that are desirable to avoid such as those by steam radiators or windows likely to be opened and thus cause wetting of the instrument and its cord in wet weather. Noisy locations make it difficult for the subscriber to use his telephone, though present day anti-sidetone sets considerably reduce interference resulting from room noise being picked up by the transmitter. Another annoying form of interference sometimes occurs when the instrument is installed in the vicinity of fluorescent lights and neon signs. The instrument and station wiring should be kept at least two feet away from the nearest fluorescent light fixture. Interference from a neon sign may be quite severe especially when the latter develops a defect, requiring that the telephone instrument be located at a considerable distance from the sign.

The instrument should be located

(Please turn to page 69)

**Table No. 2—Fasteners for Mounting Wall Sets and Bell Boxes.**

| KIND OF MOUNTING SURFACE | TYPES OF FASTENERS FOR: SETS WITH ¾" BASE (NOTE 1.) | SETS WITH SHALLOW BASE (NOTE 2.) |
|---|---|---|
| Back Boards<br>Hard Wood<br>Metal Sheathing over Furring on Brick (Note 3.) | 1¼" x No. 8 R.H. Wood Screws | ¾" x No. 8 R.H. Wood Screws |
| Soft Wood<br>Metal Sheathing over Wood (Note 3.) | 1½" x No. 8 R.H. Wood Screws | 1" x No. 8 R.H. Wood Screws |
| Plaster on Wood Lath<br>Metal Sheathing over Plaster on Lath (Note 4.) | 2" x No. 8 R.H. Wood Screws | 1½" x No. 8 R.H. Wood Screws |
| Plaster on Metal Lath<br>Plain Hollow Tile<br>Plastered Hollow Tile<br>Tiling over Plaster on Metal Lath<br>Plaster or Composition Wall Board | ⅛" x 4" B.H. Toggle Bolts (Note 6.) | ⅛" x 3" B.H. Toggle Bolts (Note 6.) |
| Brick<br>Marble<br>Metal Sheathing over Brick (Note 3.) | 1½" x No. 8 R.H. Wood Screws in ¾" x No. 6-8 Lead Screw Anchors | 1" x No. 8 R.H. Wood Screws in ¾" x No. 6-8 Lead Screw Anchors |
| Plastered Brick<br>Tiling on Brick<br>Gypsum or Plaster Block (Note 7.)<br>Concrete Block (Note 7.) | 2½" x No. 8 R.H. Wood Screws in 1½" x No. 6-8 Lead Screw Anchors | 2" x No. 8 R.H. Wood Screws in 1½" x No. 6-8 Lead Screw Anchors |

Notes:

(1) Includes backboards and wood or metal sets with backs ¾" thick.
(2) Includes plastic type wall sets, small compact bell boxes, battery boxes and connecting blocks.
(3) With or without furring between the sheathing and surface underneath. Mount set on backboard.
(4) If attachment can be made to a stud behind the wall board, fasten the set with two 2" or 1½" x No. 8 R.H. wood screws to the stud and two ⅛" x 4" or 3" B.H. toggle bolts directly to the wall board. It may be sometimes necessary to use a backboard for more solid mounting.
(5) Except in the case of plaster or composition wall board, use only two toggle bolts placed in holes drilled in locations corresponding to mounting holes in opposite corners on the diagonal of the set or backboard.
(6) If the hole goes into a hollow part of the plaster or concrete block, a ⅛" x 4" or 3" toggle bolt may be substituted for the anchor.

Chief among new equipment designed primarily for FM broadcasters is complete Finch Broadcast studio facsimile transmitter-monitor system shown in photograph above. Unit consists of monitor control desk, two Finch high quality precision broadcast scanners, each with associated monitor receiver, power units, amplifiers and selective switching arrangements for insuring uninterrupted transmission for any number of facsimile pages.

# *Facsimile* SPEEDS UP *Message Transmission*

By John G. Reynolds

Managing Editor

IF the Romans, the Incas, and Kublai Khan, the early founders of highly organized communications systems depending entirely upon the speed of man, horse and sail, were to witness modern-day facsimile systems of sending pictures, comics, box scores, etc., by wire or radio so that an image of the original is produced with photographic precision at the point of reception, they would realize that man had truly overcome handicaps of distance, range, and speed that hampered early day efforts to obtain fast message transmission.

Historically, the facsimile idea is not new. Principles involved were first stated more than a century ago, but many years passed before development of electronics made practical use possible.

The first record was sent over a telegraph circuit in 1842 by Alexander Baine, an English physicist, and Professor Arthur Korn did a great deal of work on improving the method in the early part of this country. The most recent work has been done by Jenkins, Finch, Cooley, Ranger, Hogan, Ives, Bellin and a number of others.

During the last 25 years Captain W. G. H. Finch, President of Finch Telecommunications, Inc., Passaic, New Jersey, has led the way in translating the theoretical art of facsimile to a practical communication system.

### *Facsimile Ready For Commercial Service*

Recent demonstrations of facsimile have served to focus the attention of broadcasters and communication officials on the importance and number of applications for the medium. The postwar status of facsimile indicates that it is now ready for adoption by many commercial services and will involve the use of thousands of leased telephone lines in the near future. For mobile communications and point-to-point services it is a medium whereby information of any nature can be transmitted instantaneously with a mini-

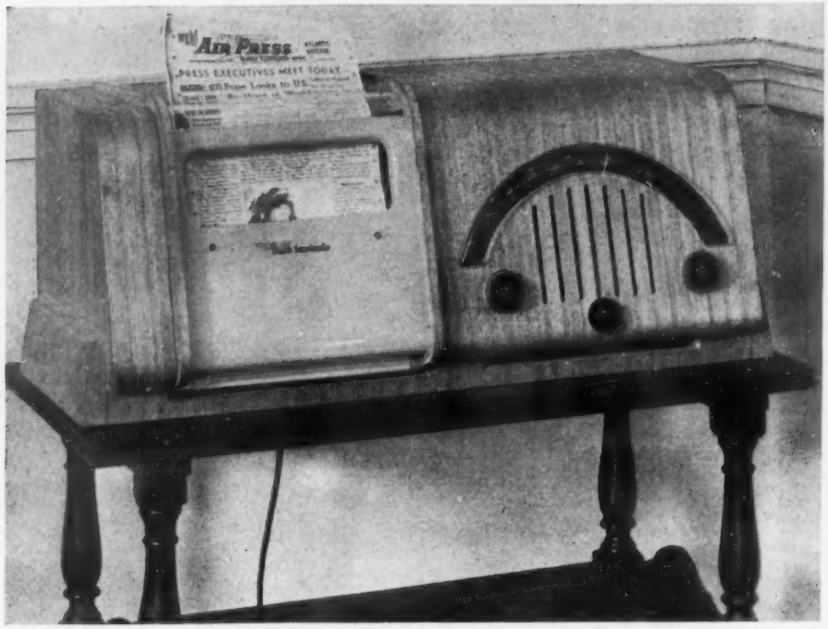


Table model of Finch FM-AM receiver.

mum of possible transmission errors. To the broadcast transmission operator and advertiser, it is both a new public service and a new advertising medium.

The techniques employed in the transmission of wire photographs and telephotographs are similar in general respects to those employed in the most recent facsimile systems. However, in wire photograph transmission, a light-sensitive film is required in the recording operation. This makes necessary the processes of film loading, developing, fixing, washing and drying to obtain the final copy. In contrast, facsimile requires no processing of the received copy, since it appears in a permanent visible form during the recording operation. The present home-recording facsimile instrument prints the received copy on a continuous sheet of special electro sensitized paper.

For a better understanding of how the facsimile works consider a photograph and in imagination cut the photograph into hundreds of thin parallel slices, each less than 1/100 inch wide. Close examination of the slices will disclose that it is nothing but a thin line of black, gray and white. If each of the various color graduations of this line is converted into an electric signal and sent in proper sequence over a wire or radio circuit so that they can be correctly reproduced at some distant point, the slice of picture can be duplicated. If all the slices are sent the same way and duplicated slices are fitted together properly, the result will be an accurate reproduction of the original photograph. The process is not as tedious as it reads as it is all done rapidly by electronic devices.

The transmitting unit consists basically of a rotating cylinder which has the picture or page to be transmitted wrapped around its surface. Beside the cylinder, mounted on a rotating lead screw which moves it slowly parallel to the axis of the cylinder, is a unit known as a scanning head consisting of a lamp, a lense and a photoelectric cell. In operation, the lamp throws a tiny spot of light on the picture which, due to rotation of the cylinder and movement of the lamp, traces a tight spiral over the entire surface of the picture—breaks it up into the thin slices we have already mentioned.

The photo-electric cell, pointed at the lightspot, produces a varying signal whose changes are proportional to the varying darkness of the picture along the line traced by the light spot. From that point on the signal is transmitted in the same way that a voice signal is sent by telephone or radio.

There is nothing in our communication channels, whether they be wire or ether, which differentiates between messages which originate as light or sound, or which must be received by the eye or ear. In every case the transmission medium carries electrical signals which vary from time to time in electrical intensity. Whether these signals shall be translatable into light or into sound depends upon what kind of terminal appartus is used in conjunction with the communication channel.

(Please turn to page 54)



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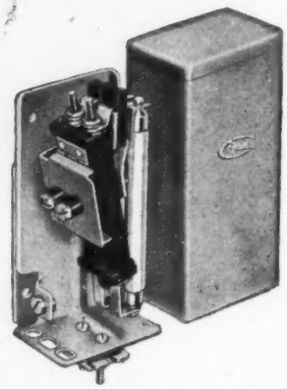

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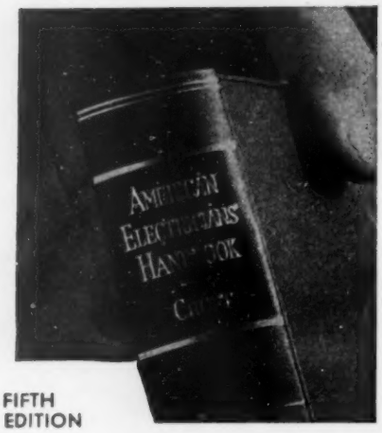


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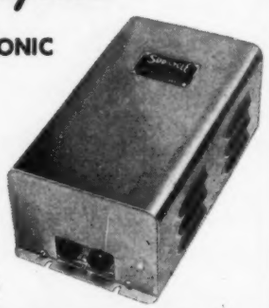
- **SELF-PROTECTING**
- **HAS NO RELAY**



Use FLOTROL the Ideal Battery Charger without moving parts.

**LORAIN PRODUCTS CORPORATION**
LORAIN, OHIO

**FOR TROUBLE-FREE LINE JOINTS** *Nicopress*

The complete splicing system for communication lines that will satisfactorily and economically meet all your requirements.

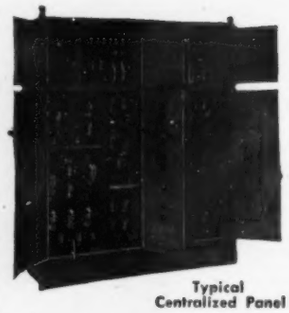
No. 31—DC Nicopress Tool

**A FEW OF THE MOST POPULAR SIZE SLEEVES**

| | |
|---|---|
| 1-064-C | 3-045-B |
| 1-080-C | 3-051-B |
| 1-080-D | 4-049-B |
| 1-102-C | 4-109-C |
| 1-102-D | 5-083-C |
| 2-083-C | 5-109-C |
| 2-102-C | 5-109-DBB |
| 2-109-D | 5-109-D85 |
| 3-036-A | 5-109-D135 |

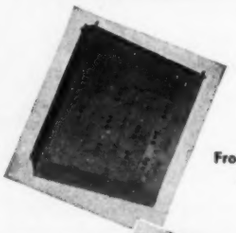
***Buckeye Carries the Complete Line in Stock***

**BUCKEYE TELEPHONE and SUPPLY CO.**
**COLUMBUS 6, OHIO**

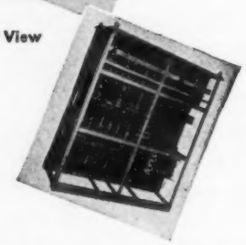


Typical Centralized Panel

**WITH CENTRALIZED CONTROL ONE MAN IN ONE PLACE CONTROLS EVERYTHING**



Front View



Rear View

Convenience and accessibility of controls are but two of the many potent arguments for centralized control. Here are a few of the advantages:—

**SAFETY** of dead front enclosure with operation of all mechanisms from the front offers greatest protection to your operator.

**SIMPLICITY** of installation and wiring results in reduced costs.

**SPACE SAVING** with the single enclosure is accomplished. Frameworks and wall supports are not needed.

**ENGINEERED CONTROL** to meet your own requirements at little or nothing above the final cost of individual control units.

Let us show you the benefits.

A Ward Leonard engineer will gladly help you to select a centralized control to meet your exact needs.

**WARD LEONARD**
**RELAYS • RESISTORS • RHEOSTATS**
*Electric control devices since 1892*

**WARD LEONARD ELECTRIC COMPANY**
96 SOUTH STREET, MOUNT VERNON, N. Y. • *Offices in principal cities*

Left to right: Col. Francis Kidwell, Maj. Gen. James A. Code, Jr., A. F. Adams, Brig. Gen. C. K. Nulsen.

## A. F. Adams Honored By War Department

At a luncheon ceremony held in Chicago, October 31, Arthur F. Adams, executive head of the Gary Group and chairman of Automatic Electric Company, was officially presented with the War Department's Certificate of Appreciation "for patriotic service in a position of trust and responsibility". The presentation was made on behalf of the Secretary of War by Col. Francis Kidwell, Signal Officer, Fifth Army, in the presence of a number of guests which included Brig. Gen. C. K. Nulsen, C.O., Fort Sheridan; Col. T. J. Marnane, Adjutant General, Fifth Army; and the principal executives of the Gary Group.

Maj. Gen. James A. Code, Jr., acting for the Gary Group executive staff, introduced Col. Kidwell, who described some of his experiences in the Italian campaign, and paid tribute to the manufacturers and suppliers of communication equipment whose success in keeping material and equipment flowing to the campaign theater made it possible for the Signal Corps to build and maintain permanent and high grade communication facilities to aid in the Allied advance up the Italian "boot".

Col. Kidwell concluded by reading the citation, and in presenting the certificate stressed Mr. Adams' personal efforts and leadership as well as the contributions of the various Gary Group organizations to the cause of victory. The citation reads: "For valuable assistance in organizing military communications personnel for operational and training purposes, for furnishing telephone service to Army installations throughout the territory of his companies which covered 17 states, and for providing the facilities of plants in Belgium and Italy for use by the Army".

Mr. Adams responded briefly, expressing his pride at being so honored by the War Department, and extending his appreciation to those who had made the award possible.

FOR QUICKER EASIER TRIMMING WORK
use SEYMOUR SMITH TOOLS...
TREE TRIMMERS
POLE SAWS
BRUSH CUTTERS
CABLE CUTTERS
JOINTED TEST-PIKE POLES
A line of tools designed for linemen's use that are standard equipment with the world's largest Utility Companies.
Send for folder and prices of this labor saving equipment.
SEYMOUR SMITH & SON, Inc.
901C Main St., OAKVILLE, CONN.

**WANTED**

**Sales Manager for Construction Materials and Supplies**

Company with national sales organization and with exclusive distribution rights to many important lines needs man to promote sales of construction materials and supplies to Independent telephone companies.

Applicants must have good knowledge of telephone operating field, supply products and sources, and effective selling methods. Working knowledge of telephone plant construction and methods desirable.

This is an attractive position, offering unlimited opportunity to the right man. Write, giving complete information as to age, education, experience, and salary expected. Address Box 8464 c/o TELEPHONE ENGINEER PUBLISHING CORP.

# Legal News of COURTS and COMMISSIONS

## Independence, Mo., Considers 5% Occupational Tax

An ordinance levying an occupational tax of 5 per cent of gross income on the Southwestern Bell Telephone Company has received a first reading before the Independence, Missouri city council.

The tax, on rentals of telephones in Independence only, will result in increased tax expense of about $3,500 if the measure is passed.

The ordinance, which was to take effect about November 1, would end free police and fire department telephone service which the city has been receiving in the amount of $490 a year.

The tax is to be absorbed and not passed on by increase in consumer rates.

◆

## Requests Rate Increase For Maywood, Nebraska

On October 22 the Nebraska State Railway Commission considered the application of Maywood (Neb.) Telephone Co. to adjust rates for service.

Proposed new rates per month are: Business, individual, $3.25; business, party line, $3.00; residence, individual, $2.25; residence, party line, $2.00; farm, party line, $2.25. All rates are subject to discount of 25 cents if paid by 10th of month. Farm line switching, 60 cents per month, subject to discount of 10 cents if paid by 10th.

Increased rates are necessary to provide capital for modernizing the Maywood system.

◆

## FCC Grants First Highway Mobile License

The FCC has granted the Wisconsin Telephone Company a license for the first two-way highway radiotelephone system in the world providing for service on an experimental basis but under regular commercial conditions in Green Bay and vicinity.

Highway mobile radiotelephone service at Green Bay makes possible the furnishing of two-way voice communication between any telephone connected to the general wire network of the Wisconsin Bell's Green Bay exchange and suitably equipped vehicles traveling along country highways or city streets within range of the transmitter.

The Green Bay installation is the first link in the chain of highway radiotelephone systems planned by the Bell System to make vehicular telephone communication ultimately available in important cities and on major highways over a large portion of the nation.

◆

## Missouri Company Sued For $13,000 Back Wages

A suit to recover approximately $13,000 in unpaid wages and liquidated damages from the Polk County Mutual Telephone Association, Bolivar, Mo., has been filed in the Springfield, Mo., Federal Court by Mrs. Mary Miller.

The petition charges that Mrs. Miller received $2,255 for 14,560 work hours while employed as a switchboard operator from August, 1940, to March 31, 1944. According to the Fair Labor Standards Act, Mrs. Miller charges she should have received $5,460. The plaintiff also seeks to recover $3,276 in overtime accumulated by her husband Shirley Miller, while employed as manager during the same period.

Mrs. Miller charges that the telephone company compensated her at a rate less than 30 cents per hour, plus time-and-a half for overtime.

◆

## Van Meter Leaves FCC To Enter Private Business

Russell Van Meter, senior engineer of the FCC's Common Carrier Division, has left the commission to enter private business in Canada. Mr. Van Meter joined the Commission in March, 1942. From December 4, 1942 to December 17, 1945, he served with the Navy and left the service with the rank of Lieutenant Commander.

Before joining the commission, Mr. Van Meter served 12 years with the Michigan Bell Telephone Company where he was supervisor of employment and training. Previously he had been with the Associated Telephone & Telegraph Company for three years as an industrial engineer and manager of the company's foreign division.

Another recent departure from the FCC's Common Carrier Division was that of Alphonsus L. O'Toole who has joined the Veterans' Administration to head its newly-formed Research Division. Mr. O'Toole served as an engineer with the commission and during the war served in the Navy as a commander, one of his assignments having been Executive Officer to Admiral Halsey.

◆

## Lycoming, Pa., Company Buys Berks & Lehigh T&T

The Pennsylvania Public Utility Commission has approved the sale of the Berks & Lehigh Telephone & Telegraph Company to the Lycoming Telephone Company. The Commission refused to approve a common stock issue for the full purchase price, contending that the Lycoming company was overcapitalized. It approved a $2,400 issue and suggested that the remaining amount be obtained through a short term loan.

◆

## Decision Delayed on Bell Service Extension

A decision on the application to extend Southwestern Bell Telephone Company city service to an area three miles north of Moore, Oklahoma, has been delayed.

## Requests Bell Provide Fixed-Wire Service

The U-Dryvit Auto Rental Company, Inc., of Cambridge, Mass., now experimentally operating 20 automobiles and trucks equipped with radiotelephone units, has filed a complaint with the FCC charging that the New England Telephone & Telegraph Company has refused to allow the auto rental company to tie-in its system with the telephone company's local and long distance facilities. The U-Dryvit company alleged that it was unable to negotiate with the telephone company to set up fixed wire connections between the New England Tel. & Tel.'s central switchboards and the PBX board at the U-Dryvit offices.

The auto rental company, which in its complaint says that it hopes to extend its radiotelephone system to more than 200 trucks and automobiles being rented to business concerns within a 50-mile radius of Boston, claimed that it requires a fixed wire connection between its PBX board and the telephone system of the New England Tel. & Tel. so that its customers will be able to talk directly to either their offices or points of operation.

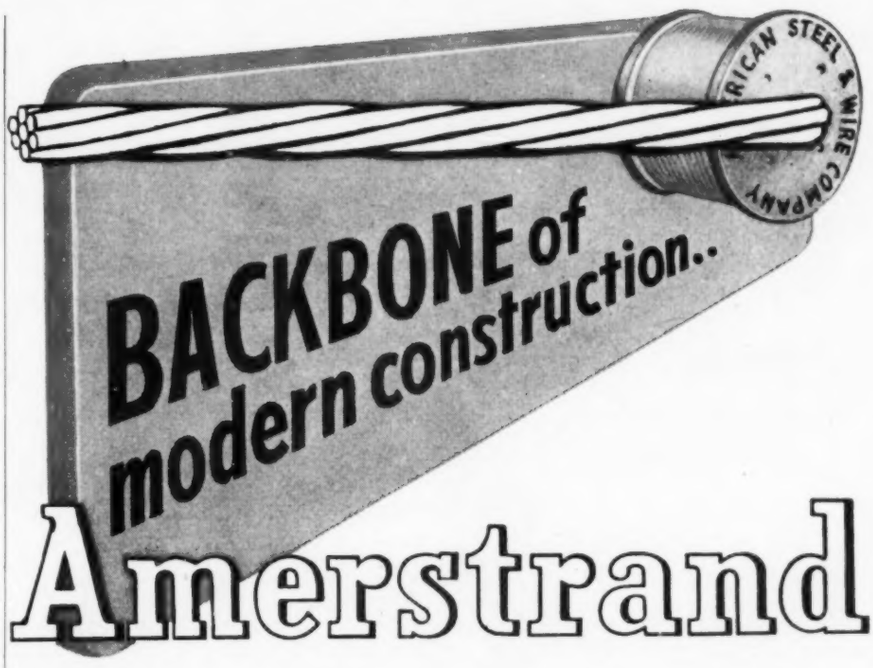
The complaint contained an exchange of correspondence between officials of both companies. The New England Tel. & Tel. pointed out to the rental company that it could not make the connections requested "consistent with its general policy of long standing not to connect with privately owned systems in the same territory in which it operates." The telephone company also stated that the tie-in requested would require operation by the U-Dryvit concern on frequencies now being used by utilities for emergency purposes and it was felt that this practice would not be allowed by the FCC.

The company estimated that under its present plans it will spend $112,500 for radiotelephone equipment and that, on a four year basis, it will spend an additional $194,304 for operation and maintenance of its system. The U-Dryvit concern also said that it hopes to extend its operations to a goal of 700 cars and trucks with a comparable increase in the amount of radiotelephone equipment it will use.

◆

## Minnesota Sale Approved

Home Telephone Company, Grand Meadow, Minnesota, has been authorized to convey and transfer to the Racine (Minn.) Telephone Company, telephone properties, located in the vicinity of Racine, county of Mower.


All through your outside plant, guys and messengers have a big job to do. Through rain and wind, sleet and snow, their strands must carry your cables and keep your poles erect. From the central office to the most distant pole, they form the backbone of your plant.

No wonder telephone men everywhere choose Amerstrand for their messengers and guys. It's formulated specifically for these services, and its production is carefully supervised at every stage. That gives it the tensile strength and the superior corrosion resistance that is needed for telephone construction, to make the installation of messengers and guys a "one-time" job.

Amerstrand STEEL STRAND MADE BY AMERICAN STEEL & WIRE COMPANY

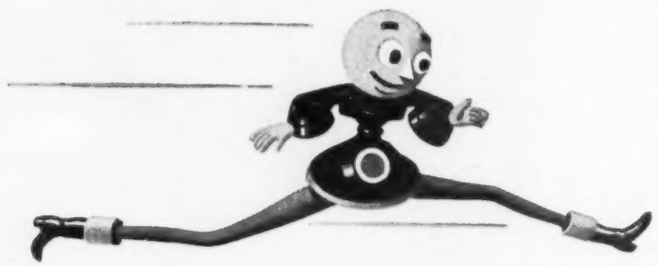
And Amerstrand is made in different weights and strengths, so you can order just the one you need for each job. That means better control of job costs—no hit-or-miss ordering of strand that's too light or too heavy.

Order Amerstrand for the finest of modern construction.

RECOMMENDED AND DISTRIBUTED BY

AUTOMATIC ELECTRIC SALES CORPORATION

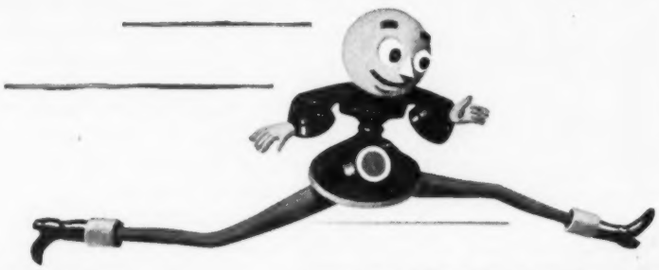
1033 WEST VAN BUREN STREET, CHICAGO 7, ILLINOIS



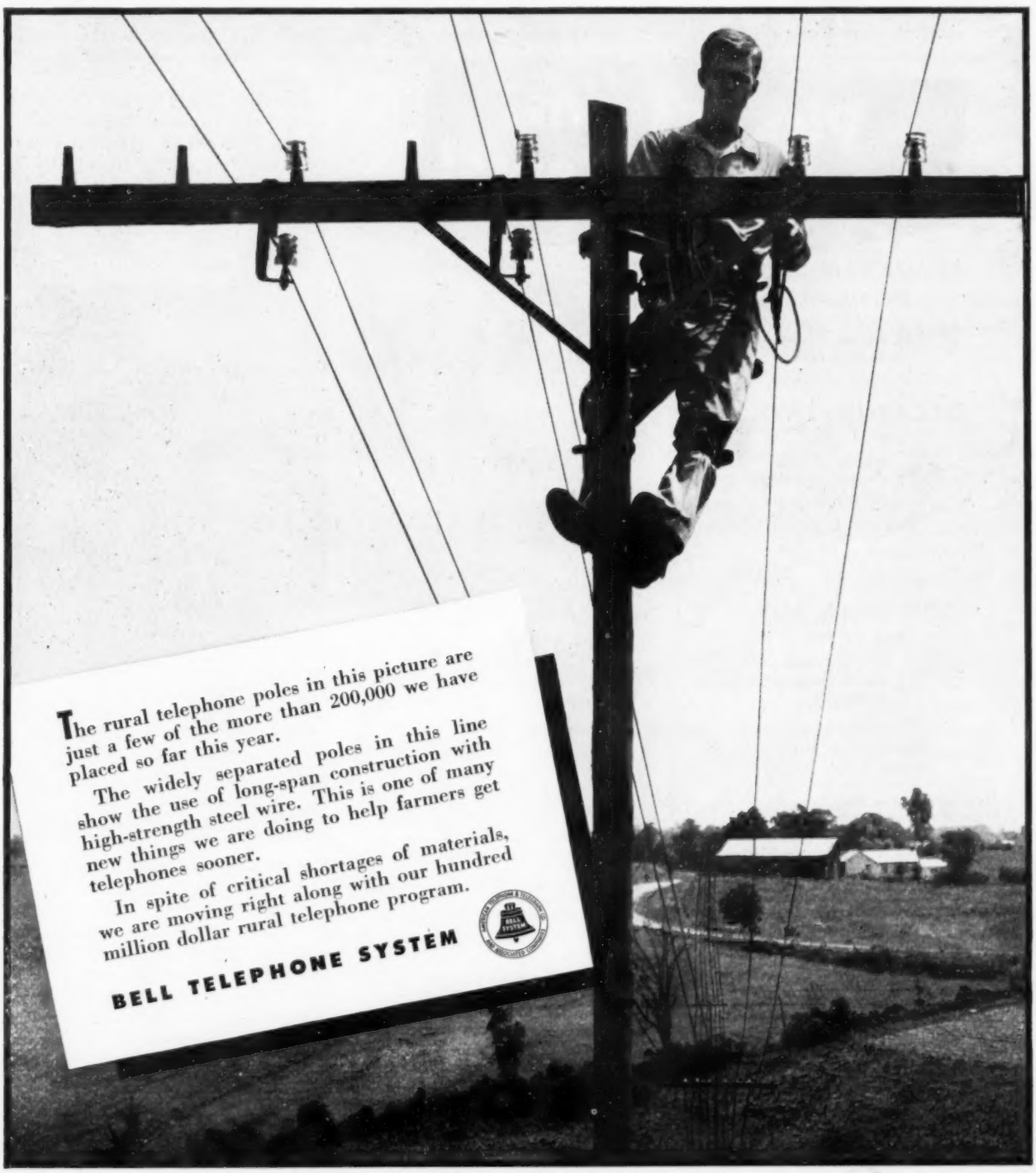
# MODERN PAUL BUNYAN

• The giant cross-country strides of the legendary lumberman might be compared to those being made today by the telephone industry. • The advertisement on the opposite page tells people living in rural areas how new long-span construction is helping to bring them telephone service more quickly. It appears in national farm publications during November.

AN ADVERTISEMENT OF THE BELL TELEPHONE SYSTEM



# BIG STEPS across farm country



The rural telephone poles in this picture are just a few of the more than 200,000 we have placed so far this year.

The widely separated poles in this line show the use of long-span construction with high-strength steel wire. This is one of many new things we are doing to help farmers get telephones sooner.

In spite of critical shortages of materials, we are moving right along with our hundred million dollar rural telephone program.

**BELL TELEPHONE SYSTEM**

# Facsimile Speeds Up Message Transmission

(Continued from page 46)

The facsimile receiver, used to record signals from the transmitting unit, include a cylinder rotating at exactly the speed of the transmitter cylinder. Mounted on the surface of the cylinder is a spiral wire or blade which extends once around the cylinder and from end of its surface. This spiral is in contact with a metal blade, so that each turn of the cylinder causes the point of contact to move from one end of the blade to the other. A continuous sheet of special electro-sensitized paper passes between the blade and the cylinder, automatically advancing at the same rate of speed as the movement of the photo-electric cell in the transmitter.

The signal passes from the blade to the spiral, and the combined movement of the rotating spiral and the paper, synchronized with the transmitter, applies the signal to the paper with each variation in the exact spot corresponding to the light spot at that moment. The paper reacts to reproduce the correct shade of black, gray or white at each point, so that the final result is a duplicate or facsimile copy of the picture at the transmitter.

The present day facsimile devices constitute a communication system of unparalleled accuracy. Their basic characteristics of exact duplication eliminates all possibility of transmission errors. It makes no difference whether the page to be sent is a handwritten letter, a typed document, a sketch or a photograph—the message received cannot contain any errors in substance.

Facsimile not only adds to the accuracy of all communication services, due to its own high transmission rate, but eliminates the additional step of verifying messages by repeating.

The ability of the facsimile equipment to send any information that can be put on paper opens new fields of communications in both radio and wire. Business processes can be accelerated by reducing from days minutes the transmission time of ite which now are sent by mail. Maps, sketches, diagrams, printed forms, signatures and innumerable other vital items can be sent coast to coast as quickly as a telegram.

New Finch AM-FM Facsimile Console Model

Principal applications of facsimile to the telephone business appear to be: (1) Supplying market news service


**Pick a Town the Size of Yours!**

**FT. WAYNE, IND.**
POP. 118,410
200% Gain in Telephone Directory Advertising Revenue *

**DECATUR, IND.**
POP. 5,200
300% Gain in Telephone Directory Advertising Revenue *

**COLUMBIA, MO.**
POP. 18,399
310% Gain in Telephone Directory Advertising Revenue *

**DURHAM, N. C.**
POP. 60,195
217% Gain in Telephone Directory Advertising Revenue *

***Percentages show gains in revenue since directory advertising sales in these markets have been handled by the Loomis organization.***

These are just a few examples of the substantial returns the Loomis organization is creating for telephone companies all over America. Whether your town is large or small . . . no matter where it may be . . . the Loomis organization's proved sales methods can help you derive more income from directory advertising.

Wesley H. Loomis, III and Roland T. Beard, Vice-President, Gettle Bldg., Ft. Wayne, Indiana, cordially invite your inquiry.

Loomis ADVERTISING COMPANY

502 Gettle Bldg., Ft. Wayne 2, Ind.
506 Olive St., St. Louis 1, Mo. 20 West 9th St. Bldg., Kansas City 6, Mo.
6908 Market St., Upper Darby (Phila.) Pa.; Omaha Nat'l Bank Bldg., Omaha 2, Neb.

to brokerage houses, markets, leading business men, etc., (2) furnishing a news service over telephone wires to subscribers on a monthly rental basis; (3) passing written messages over telephone lines for inter-company use on large operating networks, and (4) furnishing low cost wire photo service to the smaller newspapers on a toll call basis.

If facsimile machines can be installed at substantially lower costs than teletypewriters, it is possible that a substantial market for news and private line facsimile service can be built up in the telephone field. Facsimile would have the distinct advantage over teletypewriter of permitting a faithful reproduction of all types of material such as photographs, charts, business forms, drawings, newspaper clippings, etc.

***Types of Service***

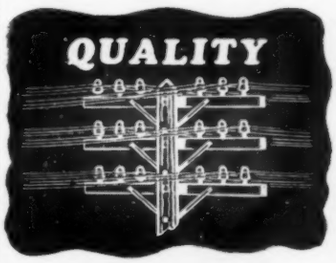
Typical of the service that might be offered, would be for a telephone company to rent machines to business houses which would use the ordinary long distance toll circuits for connection to home or branch offices in other cities. Thus, written material could be handled in much the same manner as a long distance toll call.

With radio channels at a premium, low cost facsimile receivers could be put out on a rental basis by a newspaper or news gathering agency to local subscribers. Wire lines would be rented from the telephone company to reach these subscribers.

One of the first of the new postwar facsimile machines is now being offered by Finch Telecommunications, Inc. This machine, which is shown is available in two different models. One model will work on ordinary telephone lines, while the other is intended for use on telephone or radio circuits having a wider than normal frequency range.

The machine of principal interest to telephone companies is known as the Type FRS-140A, a medium speed unit of the duplex type, and a complete sending and receiving machine in a single housing. Designed to operate on any type of telephone channel which will handle a range of frequencies extending from 300 to 2300 cycles per second the machine operates with a sub-carrier frequency of 1300 cycles per second. The machine will transmit 15 square inches of copy per minute which is equivalent to about 160 words of single spaced typewritten copy. Weighing 75 pounds and only 16″x16″x12″ in size, it has a power output of approximately 0 db (based on a zero reference level of 6 milliwatts), and is designed to watch a 500 ohm line.


# why it's good judgment to order telephone supplies via GraybaR .....




All of the hundreds of telephone supplies that Graybar distributes are first-quality products of leading manufacturers. They are supplies that were designed for telephone service and that have proved excellent in telephone service. So you're sure of *dependable supplies* via Graybar.

Our offices and warehouses in more than ninety cities comprise an efficient, nationwide distribution network, which makes the nation's best telephone supplies available to you from a single source near-by. So you're sure of the *fastest possible deliveries,* under today's difficult conditions, via Graybar.

Graybar has been closely associated with your industry since the very inception of the telephone. The Graybar Specialist near you understands telephone operations. His responsibilities are to see that you get the best items for your needs, to see that they arrive when and where you want them, and to see that they do the job the way you want it done. So you're sure of *really helpful service* via Graybar.

With these assurances, you know what you'll get when you order telephone supplies via Graybar. *Graybar Electric Company. Executive Offices: Graybar Building, New York 17, N. Y.*

4662

IN OVER 90 PRINCIPAL CITIES

EVERYTHING IN TELEPHONE SUPPLIES via GraybaR

# Personalities IN THE NEWS

**Lester O'Neal,** Fedora, South Dakota, has purchased the Artesian, South Dakota, exchange from the Central West Company which has operated it for a number of years. Mr. O'Neal also operates the telephone exchanges at Fedora and Rayville. In announcing his purchase of the exchange, Mr. O'Neal stated that he plans improvements of the system when material becomes available.

◆

**J. R. Schmidt,** Noel, Missouri, has announced the sale of the Noel Telephone Company to **Mr. and Mrs. Bert Howerton** and **Cecil Lewis.** Mr. and Mrs. Howerton plan to operate the switchboard and Mr. Lewis will take care of the lines. Mr. Howerton, who is postmaster at Noel, will continue with his postal duties.

◆

**Edward C. Hammer,** discharged veteran of World War II, recently purchased the Hillsboro.(Wis.) Telephone Company from E. V. Wernish. The exchange was started in 1896, and Mr. Wernish has owned the system since June 1, 1906.

◆

**Frank Bruce Saunders,** 62, staff plant extension engineer of the New York Telephone Company, died Sept. 26 at the Mountainside Hospital, Montclair, N. J., following a heart attack.

Mr. Saunders had been in the telephone business for 45 years. He started as an office boy with the Michigan State Telephone Company at Saginaw, Mich., later becoming installer, lineman and wire chief.

◆

**Oscar S. Ellefson,** toll maintenance supervisor for the Wisconsin Telephone Company, completed 25 years of service on August 31.

Mr. Ellefson started his service in the telephone business August 31, 1921, as lineman. He served successively as line foreman, facilities engineer, transmission engineer, facility man, inspector, cable tester, chief tester, plant staff assistant, and district plant clerk. On January 5, 1941, he received his present position.

◆

**Stephen Arthur McKie,** 62, general plant superintendent for the Southwestern States Telephone Company, died at his home in Brownwood, Texas, on October 2.

He had been with the Southwestern States company since its organization in 1928, and prior to that time had been associated with the West Texas Telephone Company since May 1, 1907.

Mr. McKie was general plant superintendent for the old West Texas company and retained the position when the company was sold to Southwestern States.

◆

**Leo Yager,** was recently elected to his 27th term as president of the Citizens Telephone Company, Decatur, Indiana. All other officers were also reelected. Charles D. Ehinger, discharged sometime ago from the armed forces, was named again to his position as secretary and general manager.

**Brigadier General Calvert H. Arnold, Chief, Signal Corps Procurement and Distribution Service, representing the Secretary of War, Robert P. Patterson, and Major General H. C. Ingles, Chief Signal Officer, presenting a Certificate of Appreciation to P. V. Galvin for the outstanding and dependable service rendered by the Galvin Manufacturing Corporation to the Signal Corps during World War II.**

# The Art of Soldering

(Continued from page 29)

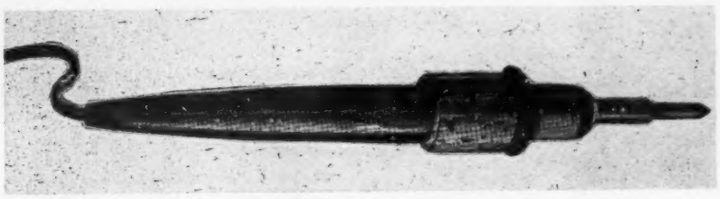


Fig. 8—The Ungar quick heat iron.

tip or plug tip design. See Figure 6.

In recent years several new types of irons have made their appearance. These are of the "quick heat" type. One of these, the Kwikheat Soldering Iron (Figure 7) is hot and ready to use in 90 seconds after plugging in. It is available in 225 and 450 watt sizes. Operated with thermostat control it can be regulated for many uses. The Kwikheat iron has seven different styles.

Another quick heat type is the Ungar iron shown in Fig. 8. This iron utilizes a compact replaceable tip which carries a resistance element which is built directly into the tip

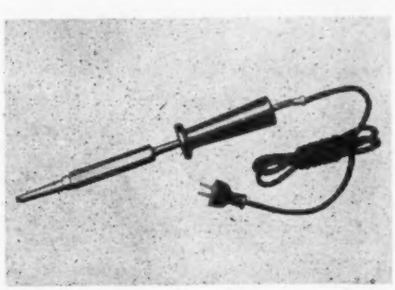


Fig. 7—Kwickheat Soldering iron is hot and ready for use 90 seconds after plugging in.

hence results in a very quick heating time.

A new iron manufactured by Weller is the convenient flash-type. This iron utilizes the heating effect of a low voltage high current (about 500 amperes) which is passed through a heavy copper wire looped tip. This iron comes up to soldering heat in about 5 seconds and is useful for many types of telephone soldering operations particularly those involving light gauge wires and terminal lugs.

For outside work and where power is not available ordinarily, soldering coppers shown in Fig. 5 are useful. These are made in various weights and the size to be used will depend on the type of work involved.

Poor soldering will result if the copper tip on the soldering iron is not kept properly shaped and tinned. For most telephone work a chisel point should be used as it can be inserted into small spaces without interfering with existing wires or soldered joints. The face of the iron should be dressed to the proper shape with a rasp and then tinned (See Fig. 9). Tinning can be accomplished by applying rosin core solder to the filed surface. Sometimes a little extra filing with the rasp is required after the solder is applied to get the entire surface tinned. If an iron is allowed to become too hot and even with normal use the tinned copper surface will become pitted; it is therefore necessary to periodically clean the copper tips and restore the tinned surface. The tips

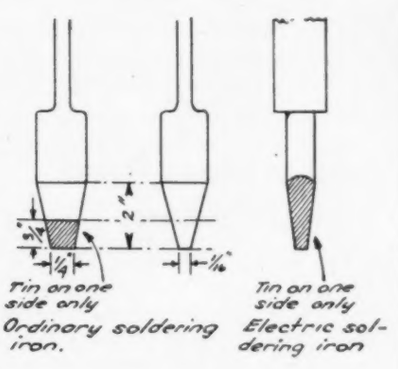
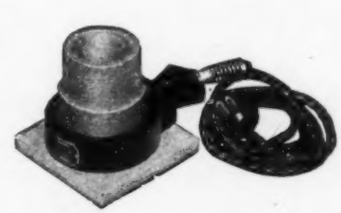



Fig. 9—Proper shape tips for telephone soldering coppers and electric irons.



Electric soldering pot cast in one piece to a square base of heat resisting material. Flat type element is easy to replace.

SINCE 1889
NATCO
CLAY CONDUIT
The proved and standard Protection for Underground Telephone Cables.
Cheapest in the long run. Highest quality and a full line of shapes.
National Fireproofing Corp.
202 E. Ohio Street, N. S.
PITTSBURGH, PA.

PREMAX
Metal Markers
Outlast the Pole!
What are your costs for maintaining the stenciled markings on your equipment? Are they increasing yearly as labor costs rise?
You can eliminate cost on identification by using Premax Metal Letters, Figures and Tags. The initial investment is less than it costs to stencil. Write for complete details and prices.
Premax Products
Division Chisholm-Ryder Co., Inc.
4708 Highland Ave. Niagara Falls, N. Y.

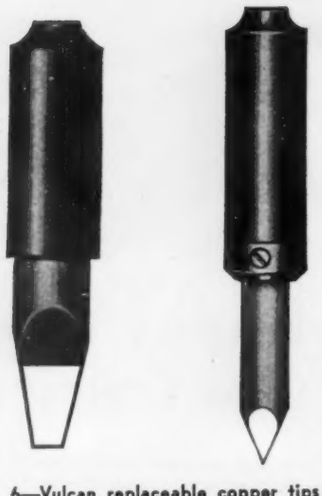


Fig. 6—Vulcan replaceable copper tips are made in 14 standard sizes.

used on electric soldering irons should not be hammered out but should be dressed down to a smooth surface with a file or rasp. Hammering tends to destroy the contact between the tip and the heating elements and reduce the heating efficiency of the iron.

The tips should be securely screwed into place otherwise they will not pick up heat properly from their heating elements. Soldering tips tend to become corroded in such a manner that they are sometimes difficult to remove from a soldering iron. Generally, however, if they are placed on a smooth surface and gently tapped on all sides the corroding film which binds them will be broken and they can be readily removed. Irons are available in sizes ranging from as low as 25 watts to as much as 750 watts. The 100 watt heating element type is the most commonly used in the telephone field.

◆

## Overseas Veteran Appointed District Manager Virginia T. & T.

Col. Nelson A. Mahone, recently released from military duty in the Philippine Islands has been appointed district manager of Virginia Telephone & Telegraph Company's Northern Virginia-West Virginia District, according to announcement made by L. D. Densmore, general manager of the company.

Colonel Mahone will establish district headquarters in Front Royal, Virginia. His district includes telephone exchanges at Front Royal, Luray, Shenandoah, Washington, Virginia, Charles Town, Harpers Ferry, Shepherdstown, Romney, Moorefield, Petersburg, Paw Paw, Burlington, Capon Bridge and Wardensville, West Virginia.

A part of the district staff has already been designated. Major J. R. Richardson, who served both in the European and Asiatic theatres during the war, has been designated district plant superintendent, and Miss Pattie Pace has been named district traffic supervisor. Major Richardson and Miss Pace have moved to Front Royal and have taken up their duties.

Prior to entering military service in 1941, Colonel Mahone was commercial manager for Virginia T. & T. at Charlottesville. His service with the telephone industry dates back to 1921. In taking over the operation of the Northern Virgina-West Virginia District Colonel Mahone stated that an extensive program of general rehabilitation, repair and improvement of the telephone property in his district was under way. Priority of construction, subject to available labor, equipment and material is based upon the premise of providing immediate improvement to the service of existing subscribers, particular attention being paid to the relief of present toll congestion and difficult traffic situations.

Colonel Mahone also pointed out that his appointment as district manager will not in any way detract from the authority and responsibility of Joe Compton, manager Front Royal Group, Cletus Strickler, manager Luray Group, Fenton Collins, manager Charles Town Group and Paul Miller, manager Romney Group.

◆

## Philippine Company Requests Japs Return Telephones

The Philippine Long Distance Telephone Company has requested that Japan be required to return or replace the telephone sets and equipment removed from the Philippines during the Japanese occupation. The company stated that while some of the damage to the system was undoubtedly due to fighting which occurred, it is informed that between 10,000 and 15,000 modern handsets installed in premises in the city of Manila, were removed and shipped to Japan. It urged that any of these instruments which can be located in Japan be returned to the company to aid in re-establishing telephone service to the Philippine public.

Rehabilitation of the telephone system in the Philippines has been greatly retarded by the limited facilities available and the lack of sufficient telephone instruments. Management of the company had also requested that any automatic central office equipment in Japan which is suitable for use in the Philippines be sent there as partial payment in kind for war damage.

STROMBERG CA

for unsurpassed performance . . .

*kennecott paper-insulated lead-encased telephone cable*

Kennecott Telephone Cable is made with conductors of from 16, 19, 22, 24, and 26 AWG.

Each wire is insulated with one or more wraps of manila paper, or paper made from clear rope stock with suitable proportions of wood pulp or cotton rag stock added.

The paper is wound loosely in helical form around the wire. When two or more papers are used, they are applied in reverse direction.

Dry paper is used because of its low specific inductive capacitance, which is further reduced by the air space introduced by the loose wrapping.

After insulation of the conductors, they are twisted together to form pairs, each wire of a pair being wrapped with paper of a different color for tracing purposes.

The twisted pairs are cabled together in layers, each layer being one pair thick. Alternate layers are cabled in opposite directions. The completed cable core is taped over with paper.

After removal of moisture by heat, the cable is then sheathed with lead containing 1% antimony.

STROMBERG CA

BRANCH OFFICES: CHICAGO 6, KANSA ITY 5, SA

# G CARLSON Recommends

## armstrong's whitall tatum insulators *are harder to see... harder to brake!*

No. 1 "DP" "Double Petticoat" insulator thread construction makes pin fit snugly.

Crystal-clear Whitall-Tatum Glass Insulators, product of Armstrong Cork Company, reduce malicious breakage to a minimum. Melting into the sky background, they offer hard pickings for amateur sharpshooters.

For more than 24 years, these Insulators have stood ruggedly against every kind of assault. Extremes of cold and heat leave them untouched. Even direct transverse strains prove them stronger than their supporting pins.

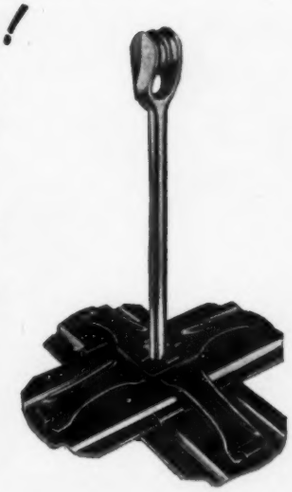
Back of their precision-engineered, automatic manufacture stand years of laboratory research. Because of this uncompromising devotion to quality, Armstrong's Whitall Tatum Insulators are today specified by leading communication systems of America.

**CONFORM TO—OR EXCEED—ASTM STANDARDS**

## hold that line... *with* chance *steel expanding anchors!*

The Chance unbreakable Steel Expanding Anchor has a larger percent of its total area in solid earth than any other expanding anchor. Before you specify new anchors, check these outstanding Chance features:

- Rigid construction of tough, heavy-ribbed steel eliminates possibility of breakage.
- Blades rigidly fastened to expanding arms and grooved to conform to ridges in housing and base plate for accurate expansion.
- Expansion in opposite directions, assuring equal distribution of pull and eliminating side twisting.
- Drop forged steel driving head.
- Patented destructible nut retainer aids installation by preventing anchor from riding up rod. Rods can be salvaged or driven down if anchor is abandoned.
- Easy installation in any position, at any angle.
- Lifetime endurance with maximum strength for top economy.



*Replace Operator's Batteries with long life*

## electrox battery eliminator

*Type PA-05004*

Plugged into your light circuit, the PA-05004 will deliver a constant, humless direct current to the operator's circuit on magneto switchboard. In case of power failure, Power-off Relay automatically transfers operator's circuit to stand-by dry cells.

Other Electrox models are available for Lamp Signal (PBX), and Automatic (PAX) Systems. Capacities of 0.5 to 6 amps, from 12 to 48 volts.

**MADE BY THE ELECTROX DIVISION, SCHAUER MACHINE CO.**

G CARLSON FACTORY, GENERAL OFFICES: ROCHESTER 3, N. Y.

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STROMBERG Telephone CARLSON

PRODUCTS and SUPPLIES

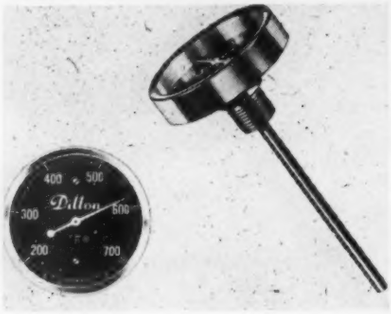
# the New Products Showcase

## New Products & Supplies of Practical Interest

**In this section you will find many items of materials, tools, and equipment that are used in, or are useful to the telephone industry. New models and improved designs have been collected by TELEPHONE ENGINEER AND MANAGEMENT for its NEW PRODUCTS department. Each item, presented in our NEW PRODUCTS section warrants your close attention. If further information is desired, simply write our NEW PRODUCTS EDITOR and complete details will be forwarded. Keep pace with the new developments in your industry.**

### Dillon Stainless Steel Thermometer

Announcement has been made of the new Dillon Stainless Steel Thermometer, manufactured by W. C. Dillon & Co., Inc. Specifications for this instrument include accuracy, strength, anodized aluminum dial, special wells, and highest grade crystal plate glass. The 3-inch diameter model weighs 8½ oz., the 5-inch model 14 oz. Non-friction has been insured by the thermometer's design and the head bezel fits tightly over gasket, sealing the dial to eliminate moisture. Specifications for stem immersion are 2 inches of liquid or 4" of gas.



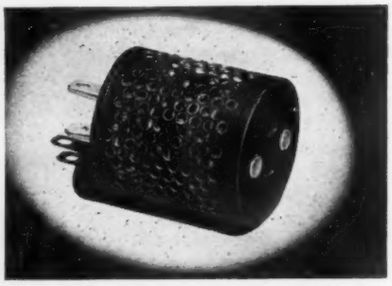

Dillon Stainless Steel Thermometer

◆

### Ward Leonard Announces Fluorescent Lamp Resistor

Ward Leonard Electric Co., Mt. Vernon, N. Y. has announced the development of their new Bulletin 26 Fluorescent Lamp Resistors of the Plug-In Type.

These plug-in type resistors are designed for use with single lamp portable fixtures for operation of fluorescent lamps on direct current. The wire-wound fixed resistor is mounted in a small perforated metal enclosure measuring 1⅝" in diameter by 1-13/16" in height, having spring pressure prongs on one end and a receptacle on the other.



Ward Leonard Fluorescent Lamp Resistor

Operating as an adapter unit, the resistor is plugged in between the lamp fixture and the direct current outlet. This fixed resistor unit requires no wiring and is connected in series with the auxiliary D.C. ballast, serving to limit the fluorescent lamp current.

Bulletin 26 Plug-In Type Resistors are designed for use with single fluorescent lamps up to and including a 20 Watt (T 12) 24 inch size. For further information write TELEPHONE ENGINEER'S New Products Editor.

◆

### Bendix Taxi Radio Receives Wide Notice

Bendix Radio's new VHF (Very High Frequency) 2-way Mobile Radio for taxicab, police and fire department

**Bendix VHF 2-Way Radio solves the problem. Taxi drivers merely pick up the telephone handset to converse with the dispatcher. The Bendix handset holder on the dashboard also acts as a tiny but effective loud speaker. Cabs are in constant contact; hear all calls from dispatchers and may answer immediately, simply by pressing the button to contact on the hand set.**

uses has caused widespread and enthusiastic notice among fleet operators and law enforcement officials all over the United States and great interest has been shown in its compact design. P. B. Tanner, mobile radio sales manager of Bendix Aviation Corporation said, in announcing the new design, "We have been working 'under wraps' for months and we have the answer for 2-Way Mobile Radio. Since our announcement stating that we intend to make this VHF Radio to sell for $265.20, we have been inundated; literally swamped with orders and requests for information".

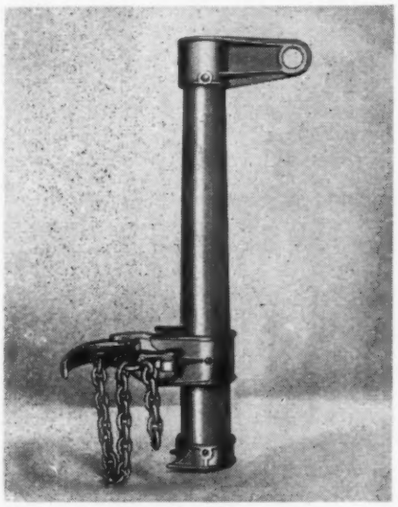
Bendix is the first in the field to design a popular-priced precision VHF 2-Way Radio for automobiles. "Incidentally", Mr. Tanner said, "this VHF 2-Way Mobile set is static-free under any condition. Transmission and reception is crystal clear at all times and in taxicab operation you can be in instant and direct touch with any one of your fleet."

The installation consists of an antenna, control unit with hand set and a single package incorporating transmitter, receiver and vibrator power supply. Tanner said, "We figured there was no need to spend half the cost of a cab to equip it with a 2-Way Mobile Radio. Judging from the telephone calls, telegrams and letters received from all parts of the United States, fleet operators agree that the new Bendix set is the answer to their problems."

◆

## A. B. Chance Announces New Pole Top Gin

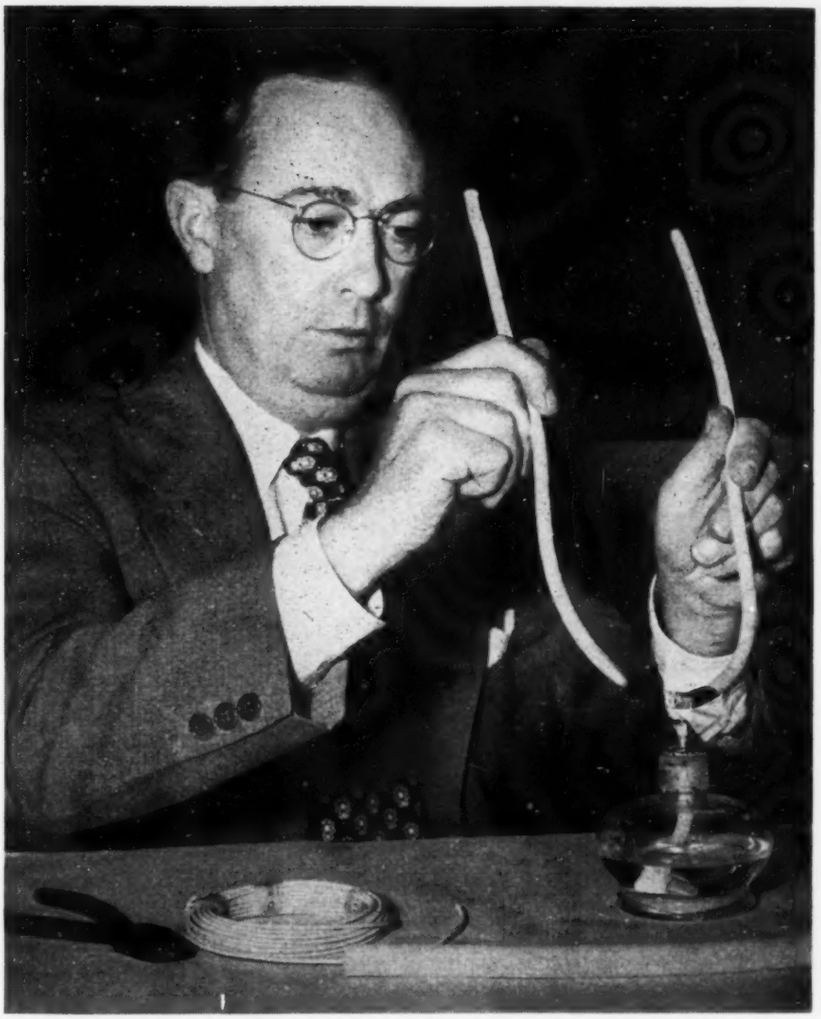
A new Pole Top Gin for hoisting telephone equipment to be mounted on poles and cross arms was recently developed by the A. B. Chance Company, Centralia, Missouri.



Pole Top Gin

This gin may be mounted on wood or steel poles and is held securely by a specially designed chain tightener which is locked in place with a safety latch. The hard wood mast is laminated to give exceptional strength. The heat treated aluminum castings make this light weight tool easily handled. The gin is rated to lift 1,500 pounds maximum load.

◆



A new aircraft wire which reduces the fire hazard and lightens the weight of airplanes is now in production. E. S. McConnell of United States Rubber Company holds it over a flame to demonstrate that the insulation will not support combustion.

## Aircraft Wire Applicable to Telephone Fields

A new aircraft wire which reduces fire hazard and lightens weight of airplanes is now being produced by United States Rubber Co. Called Neolay, the wire is 30% lighter than conventional electrical wire. The flameproof insulation consists of a layer of glass fiber to insure circuit integrity and a fire-resistant synthetic rubber applied by a special dipping process developed by the company. Overall diameter is 15% smaller than conventional wire. Since Neolay is highly resistant to oil, chemicals, mildew and fungus, the telephone industry can look to it as a product that may well prove valuable for outside and inside installations.

◆

## New Simplex Standard Speed Jack Lifts 25 Tons 10¼ Inches

A new Simplex Ball Bearing Bridge and Industrial Jack designed for heavy duty lifting, lowering and supporting has been introduced by Templeton, Kenly & Co., 1020 S. Central Ave., Chicago 44, Ill.

This jack, Simplex No. 2522, has a capacity of 25 tons and will lift a maximum height of 10¼ inches, yet it weighs only 140 pounds. Lifts high or low work to full rated capacity on corrugated top cap which is 22 inches

above ground level or on 10 inch square toe lift which is only 4⅜ inches above ground level.

Greater clearance above ground for easier operation because fully enclosed, dirt-proof ratchet and elevating mechanism are at top of Jack instead of in base as in Journal Jacks. Speedy,

Simplex Standard Speed Jack.

smooth, safe operation assured by chrome-molybdenum steel thrust bearings; heat-treated seamless alloy steel elevating sleeve, alloy steel lifting screw, forged alloy steel gears.

This new addition to the company's well-known line of Simplex lever, screw, and hydraulic jacks is described in Catalog No. 45. It was originally designed for bridge work, but it has proved indispensable for many heavy lifting jobs in factories, mills, mines, and oil fields.

◆

## Hexacon Introduces New Hatchet Type Soldering Iron

The Hexacon Electric Company, Roselle Park, New Jersey, has recently released a new bulletin describing the Hexacon Hatchet Type Soldering Iron.

The Hexacon iron is available in five sizes to meet practically every soldering need. The special Hatchet-Type Unit embodies the same quality and high degree of efficiency as the regular Hexacon irons. It is perfectly proportioned and balanced to minimize user effort with cooling fins to prevent heat conductance to the smooth finish handle.

A request addressed to the Hexacon company will bring information on the complete Hexacon line of industrial soldering irons. The line includes screw and plug tip types ranging in wattages from 40 to 700 watts and tip diameters from ¼" to 1¾".

Hexacon Hatchet Type Iron

◆

## Ward Leonard Issues Electric Control Bulletin

Completely illustrated and replete with technical data and other information that all telephone men will find of value, Bulletin Number 100,000, recently issued by the Ward Leonard Company, Mount Vernon, New York, covers the company's line of electric control devices is now available.

The eight-page bulletin contains descriptive information and illustrations on A.C. and D.C. Motor Starters, Speed and Voltage Regulators, Resistors, Ring and Plate Rheostats, Switches, Magnetic Connectors, Relays and Dimmers.

The attractive and valuable bulletin may be obtained by writing direct to New Products Editor, **TELEPHONE ENGINEER & MANAGEMENT.**

◆

## Leich Magneto Catalog Now Available

Announcement is made by Leich Sales Corporation, Chicago, Ill., of a new catalog describing the complete line of Leich magneto telephones, parts and apparatus. Featured prominently is Leich's all-Bakelite magneto wall handset telephone which can be readily changed to a desk set when necessary.

Now Ready—The Leich Magneto Telephone Catalog.

The compactness and modern appearance of this telephone is made possible by the use of a special Alnico generator. This generator weighs half as much and is half as big as the ordinary 5-bar generator, yet it is just as powerful and efficient.

This 16-page catalog is attractively printed in two colors and the product information it contains should prove useful to all magneto equipment users. Copies are available from Leich Sales Corporation, 427 West Randolph Street, Chicago 6, Illinois.

◆

## American Condenser Announces AMCON Plastic Condenser

Just announced is a new small size AMCON Plastic Capacitor. Measuring only 2-1/8" high and with a diameter of only 1-3/8", this new unit is specifically intended for top chassis mounting where space is extremely limited. Self insulating because of its molded plastic case, the unit resists high temperatures, has a wide climatic range and will bear the Underwriter's Approval.

Designed and manufactured by the American Condenser Company of 4410 N. Ravenswood Ave., Chicago 40, Illinois, the new unit will be designated as the AMCON LITTLE PL. Additional information may be had by writing the manufacturer.

◆

## Commerce Department Announces New Tube Electrometer

Dynamic condenser electrometers, said to be simpler, more sensitive and more dependable than mechanical or vacuum tube types were designed by American researchers during the war, according to a report by the Office of Technical Services, Department of Commerce.

The report was prepared by H. Palevsky, R. K. Swank and R. Gren-

chik of the University of Chicago Metallurgical Laboratory, under contract with the War Department. The electrometers are said to require only two controls for many measurements—an on-and-off switch for the power supply and a shunting switch across the input of the condenser. It is also claimed in the report that if the electrometers' condensers are constructed with care and sealed from atmosphere they will require no adjustment prior to operation.

◆

## "Easy-Lift" Wheel Tool Simplifies Wheel Changes

Attempts to make lug bolts pass through their holes while lifting an automobile wheel and tire into position resulted in the invention of a new "Easy Lift" wheel tool.

This simple but effective tool has been developed for the car tool kit

to leverlift the wheel into the proper position so that the lug bolts drop into place.

The new tool bears the tradename of "EASY-LIFT WHEEL LIFTER" and is manufactured by the T.E.D. Corporation, 928 South Flower St., Los Angeles 15, California.

◆

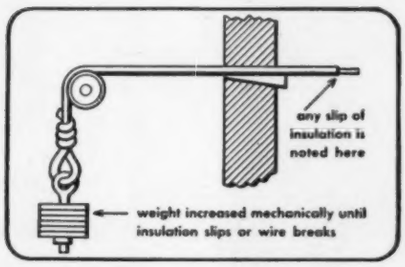
## Templeton, Kenly Bulletin on Jacks for Utilities

"Around the Utilities World with Simplex Jacks" is the title of Bulletin U46, just published by Templeton, Kenly & Co., 1020 So. Central Ave., Chicago 44, Ill.

This attractive 8-page bulletin illustrates and contains full information, specifications and prices on the various Simplex Jacks used by electric, telephone, telegraph, gas and water co-


TELEPRENE
DROPWIRE

ADHESION TEST




Specimen is wedged into solid body similar to method of fastening in field, then submitted to pull.

If adhesion is less than tensile strength of wire, the insulation will slip on wire.

***This test proves conclusively that TELEPRENE will not slip in the supporting clamp due to the lack of Adhesion between Conductor and Insulation.***

For other outstanding features of Teleprene see our bulletin *"The Story of Teleprene Drop Wire"*

TELEPRENE; the DROP WIRE with the NEOPRENE Synthetic Rubber Outer Jacket

*Prices, delivery and samples obtainable through your nearest* GraybaR *Office*

Distributed by GraybaR ELECTRIC COMPANY

Order Teleprene by WHITNEY BLAKE Catalogue No.

17TBP-R Reinforced Parallel
17TBP Parallel
17TB2-R Reinforced Twisted Pair
17TB2 Twisted Pair

** Reg. Applied for, U.S. Pat. Office*

THE WHITNEY BLAKE CO.
New Haven, Conn.
Well Built wires since 1899

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# 1947 TELEPHONE "BLUE BOOK"

and

# BUYERS' GUIDE

will be published

January 15

★

For extra copies or more particulars about this "Handyman" for purchasers, write

**TELEPHONE ENGINEER Publishing Corp.**
7720 Sheridan Road,
Chicago 26, Illinois

# 90%

of the telephone companies of the United States are planning on rehabilitation, converting to dial equipment, adding equipment and/or rebuilding their entire systems.*

# 85%

of these companies report that shortage of materials are their most urgent difficulty in carrying out these plans.*

* From "A Survey of the Independent Telephone Industry", July TELEPHONE ENGINEER & MANAGEMENT.

# 100%

of the BUYERS for these companies should find the 1947 Telephone "Blue Book" & BUYERS' GUIDE of great value in locating any and every item they need.

**There will be over 700 companies represented in the BUYERS' GUIDE Section . . . manufacturing or distributing the many hundreds of items needed in the operation of a telephone exchange. There will be more than 5,000 company listings under these items with another section explaining the meaning and giving the manufacturer of hundreds of trade named items.**

Your copy of the 1947 Telephone "Blue Book" & BUYERS' GUIDE will be mailed January 15 . . . Watch for it . . . and . . . Use it!

panies, and federal, state, and municipal departments.

Among those shown are pole jacks, reel jacks, pushing and pulling jacks, cable and wire tensioning jacks, trench and timber braces, lever jacks, hydraulic jacks (now available up to 50-tons capacity), journal jacks and special jacks for unusual requirements. The jacks shown include several models which were discontinued during the war, and which are again in production.

In addition to the Simplex Jacks which have been widely used by the utilities for decades, a number of new jacks are shown; including the Simplex-Jenny Center Hole Hydraulic Puller and the Simplex Standard Speed Bridge and Industrial Jack, which provides easier lifting for heavy loads—up to 25 tons.

◆

## Sound Equipment Corporation Develops New Soldering Iron

A soldering iron of high quality at moderate price was the aim of Sound Equipment Corporation, 3903 San Fernando Road, Glendale, California, in developing KopperKore, a conventional type, 100-Watt, electric soldering iron. Quality is most evident in the copper alloy core and its heater element of best quality nichrome wire, (mica and glass insulated), encased in a damage-proof steel case. KopperKore exceeds Underwriter Laboratory's safety standards and carries full U.L. approval.

Six interchangeable tip styles of the same copper alloy adapt KopperKore to a variety of soldering jobs.

Long-lasting, cool, comfortable Bakelite handle protects against burns. KopperKore is light weight (iron and No. 1 tip, 13½ ounces). It is nicely balanced and an ideal tool for light work on radio, telephone and day-long production lines. Operates on 110/120 volt AC-DC, any cycle. Each iron comes equipped with rest stand.

Standard with each KopperKore is six-foot cord joined to pull-proof connector, spring protected and approved by Underwriter Laboratories.

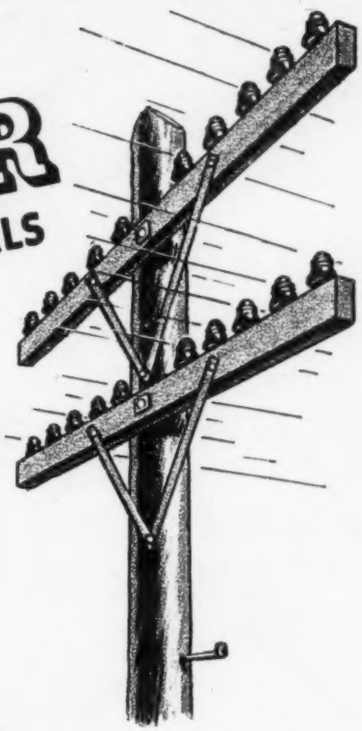
◆

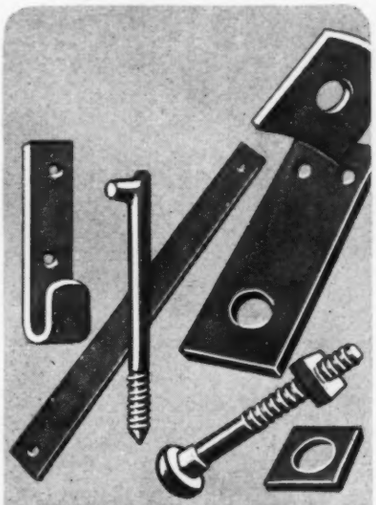
## New Truck Tire Carrier Eliminates Heavy Lifting

A knowledge of truck tire changing difficulties gained from many years of experience in the truck tire business motivated a California inventor to develop the "Ted" tire carrier which makes the changing of heavy truck tires and wheels a one man job.

With the new carrier no straining or lifting is necessary to remove the spare and replace the flat. Even tilting to upright position for rolling is done without lifting.


It's OLIVER POLE LINE MATERIALS for STAYING POWER THAT PAYS





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STEEL PINS
WASHERS (Round and Square)

*—and other Hardware for Telephone Line Construction*

Telephone men want hardware they can depend on . . . hardware that cuts down on replacement costs . . . saves on labor and labor costs . . . stresses quality and staying power.

No wonder so many linemen are "lining up" with Oliver products in the construction of new lines or for the replacement of old line hardware. Oliver quality goes all the way to keep service uninterrupted.

For staying power that pays, "Line Up" with Oliver hardware now.

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# "Wow! This job sure keeps me hopping!"

"BELIEVE me, fitting all the new dial and manual switchboard equipment and long distance facilities into Bell System central offices all around the country is keeping me mighty busy!

"In a single big dial exchange there may be 4,000 miles of wire. I may have to solder 2,500,000 connections before everything's ready for you to dial a number.

"Besides *installing* this complex apparatus, I build it. That's part of my job as *manufacturer* for the Bell System.

"I also *purchase* all manner of things for the Bell Telephone Companies... and *distribute* these supplies to them along with the equipment I make.

"Ever since 1882, I've been helping to make our nation's telephone service the best in the world. Today...with the Bell System's construction program of more than $2,000,000,000 in full swing . . . I'm busier than ever.

"Remember my name... it's Western Electric."

**MANUFACTURER...** of 43,000 varieties of telephone apparatus.

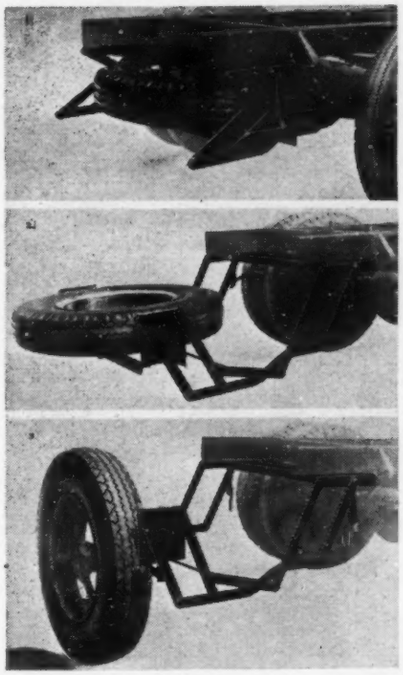
**PURCHASER...** of supplies of all kinds for telephone companies.

**DISTRIBUTOR...** of telephone apparatus and supplies.

**INSTALLER...** of telephone central office equipment.

**Western Electric**

A UNIT OF THE BELL SYSTEM SINCE 1882



No. 1—Shows tire and wheel securely clamped under bare truck chassis. No. 2—Carrier is extended so tire clears body of truck. No. 3—Carrier cradle tilted so tire rests on ground ready to be detached and rolled away.

To change a tire the holding clamps are released and the cradle portion of carrier which holds the tire and wheel is pulled out and away from truck body to a position where the tire is clear and can be tilted upright while it is still attached to the carrier. Tire then rests on the ground and when detached from carrier by the removal of holding clamp, it may be rolled to wheel requiring replacement. The flat is rolled to carrier and clamped to the cradle while in upright position, after which it is tilted on cradle swivel to horizontal position, pushed back under chassis in carrying position and securely fastened there with positive clamps that prevent vibration when on the road.

The carrier is bolted to the chassis frame of truck, trailer or bus either at the rear or side. It is constructed to withstand a load stress equal to four times the load it carries under normal use.

The TED TIRE CARRIER is available in two sizes and with choice of holding down bars—for disc wheel or demountable rim. For further information write **TELEPHONE ENGINEER'S**, New Products Editor.

◆

## Universal Tester Book Ready for Consumers

Engineers of the W. C. Dillon & Co., Inc., have made available a new, time-saving booklet designed to help in the calculations of material testing. The book contains a complete set of tables showing factoring of specimen tests for every material. The results are easy to follow, save hours of time, with the assurance of absolute accuracy. This attractive book can be obtained by writing **TELEPHONE ENGINEER'S** New Products Editor.

◆

## Free Samples Of Tri-Core Solder Wire

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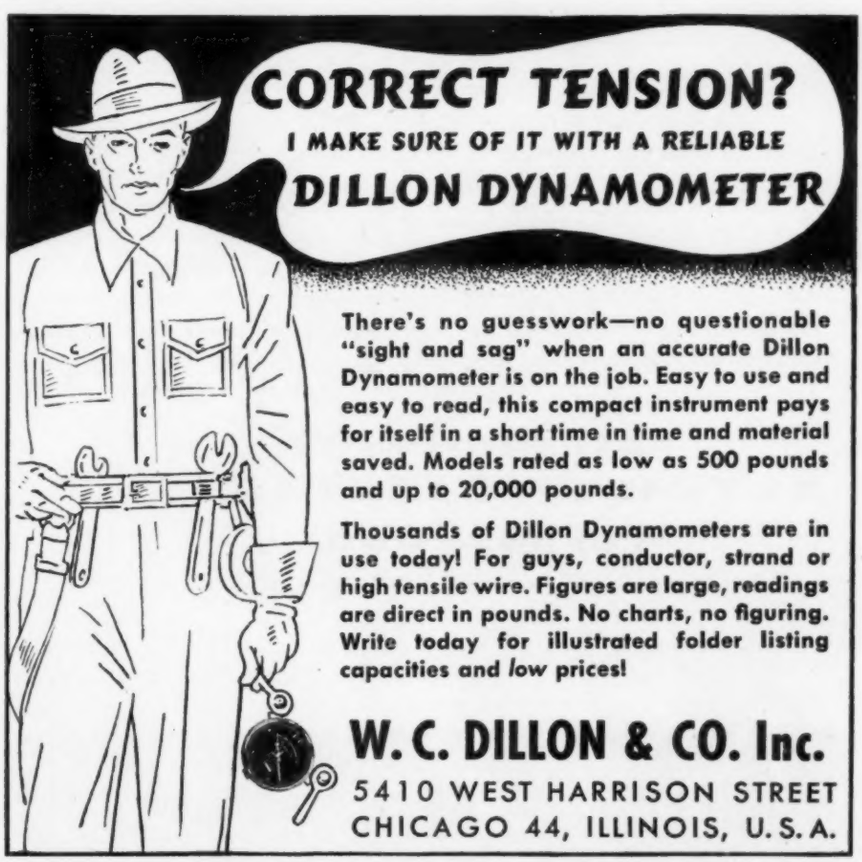


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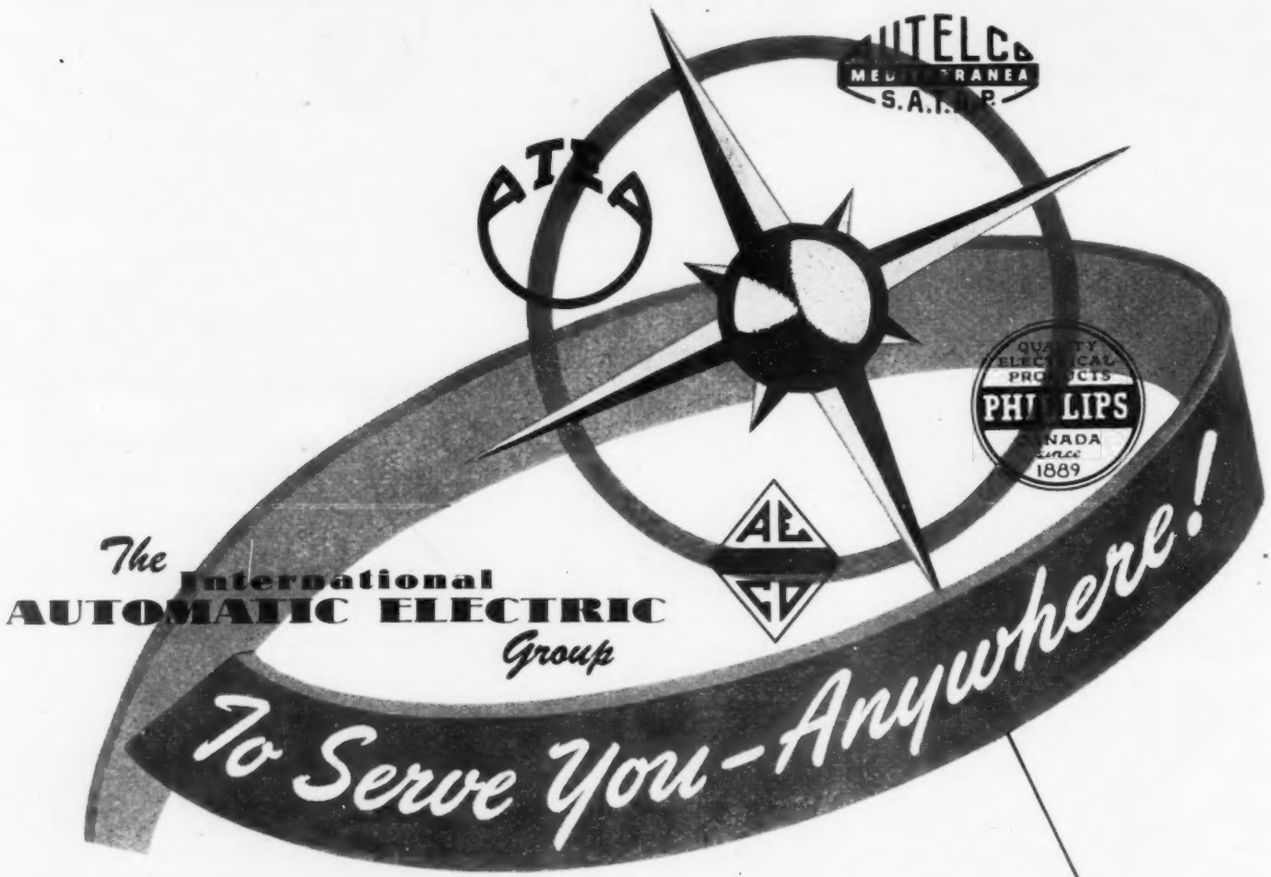


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# Modern Station Installation

(Continued from page 44)

where the subscriber can clearly hear the bell ring when he is elsewhere in the house. It is inadvisable to install the bell box in a separate room from its handset or deckstand, or to place the bell box in an enclosed space where its ringing would be muffled.

Dial instruments cause the least trouble to their users if the sets are installed where there is sufficient light, artificial or natural, to enable the dial to be clearly seen. Manual instruments may be placed in a poorly lighted location if satisfactory to the subscriber.

To avoid damage to a desk instrument with consequent annoyance to the subscriber, this type of instrument should be located on a substantial support such as a strong stand placed against a wall and having sufficient clearance for room occupants to pass around it without brushing against the instrument. or on a desk or in a well niche. Small shaky tables that are placed where the instrument can be easily knocked off onto the floor certainly should never be used. The desk instrument should not be placed on fragile supports, such as a glass case, since there is the possibility that the telephone user might drop the handpiece or receiver on the surface with resulting damage. If the subscriber insists on a location of this kind, have him provide a sufficiently wide mat or pressboard on which to place the instrument. In this connection, it should be remembered that a soft mat may muffle the ringing of the bell in self-contained handsets.

A connecting block for the instrument should be mounted on the baseboard rather than on the wall. If it is necessary to locate the block on the wall. it may be necessary to use a small baseboard on which to place the block if toggle bolts or screw anchors are required for making the attachment to the wall.

The height at which a wall type instrument should be installed depends on the desire of the subscriber. Where the subscriber is not particular on this point, the wall instrument is installed at one of the heights indicated in Fig. 16. The locations for a bell box are also shown in the illustration. In general, bell boxes are mounted with the gongs in the lower position, unless it is necessary to reverse this position to make it possible to open or close the cover in cramped places. It is inadvisable to mount a bell box horizontally so that the gongs are above one another, since the ringer will not work properly.

Sometimes it is necessary to place a wall instrument in the corner of a room. When this is done, care should be taken to so locate the instrument that the user can easily take off and put back the receiver or operate the generator crank without scraping his knuckles on the side wall.

To attach a wall set or back board to the wall usually requires four fasteners, though a bell box needs only two fasteners passed through mounting holes diagonally opposite each other. Fasteners suitable for various mounting surfaces are illustrated in Table No. 2.

The following methods are suggested for placing various kinds of fasteners in different kinds of surfaces for mounting wall instruments:

(1) Use ⅛-inch drill point or No.


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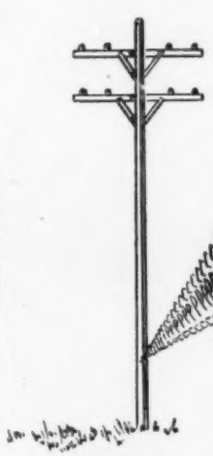

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7 push drill bit or starting holes in hard wood for No. 8 and No. 10 wood screws. For soft wood a 3/32-inch drill point is usually satisfactory for drilling the guide hole.

(2) If there is any doubt as to the kind of material under a plaster coating on the wall, probe the surface with a push drill, being careful not to break out the plaster in this process.

(3) Use a brick drill for brick or hollow tile. When drilling in hollow tile, apply light and rapid blows to prevent shelling off the inner surface of the tile. The drill should always be sharp to speed up the work and prevent damage to the tile or brick.

(4) In plastered brick or plastered hollow tile, use a sharp bell hanger bit to prevent breaking out the rim of the hole in the plaster coating. When the brick or tile underneath is reached, change to a brick drill and continue drilling to the desired depth.

(5) For holes in marble or glazed tiling, use a ⅜-inch twist drill in a wheel drill to pierce the marble or tile coating and then change to a brick drill when the brick underneath is reached. In the case of glazed tiling, use the ⅜-inch drill bit first and then enlarge the hole with a ½-inch bell hanger bit.

(6) Holes should not be drilled in the mortar joints of brick or tiling, since otherwise screw anchors may not hold properly in them. Locate the holes at least 1-inch away from the edge of the brick or tile block.

(7) Holes for screw anchors should be drilled to a depth that will provide clearance for screw ends in cases where the screw will protrude from the end of the anchor. Anchors should be inserted flush with the surface of the material in which the hole is drilled, and should be long enough to extend through an outer coating into the harder material underneath as in the case of plaster on brick.

### *Conclusion*

The installation practices discussed in this article are based on a study of methods used by plant men of a large independent company in installing subscribers' equipment. Ideas contained herein may prove of value to other telephone companies wishing to improve their own methods. The important thing is that plant men engaged in installation work, either on a full time basis or in conjunction with other duties such as trouble locating, should be encouraged to improve their skill in handling this work. They should also be encouraged to study their methods and present ideas that may prove sufficiently sound to be incorporated in the company's standard practices. Methods must be allowed to develop on a sound and practical basis in step with new developments in telephone equipment.

◆

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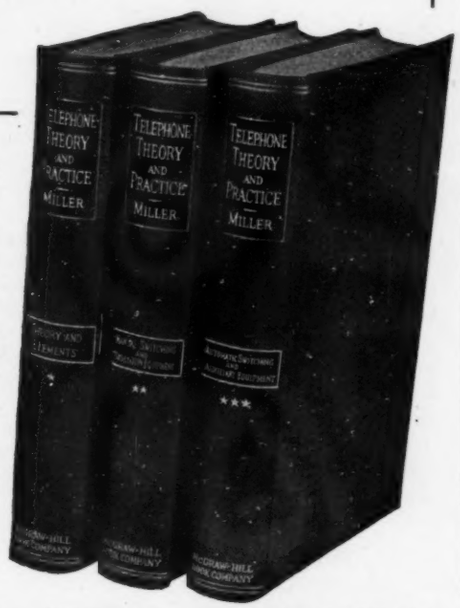


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# Line AND Desk

L. M. HARRINGTON of Kearney, New Jersey, writes in reference to an inquiry as to the best method of polishing switchboard cords answered in a recent issue of TELEPHONE ENGINEER AND MANAGEMENT. Mr. Harrington states that rather than using a motor and chuck arrangement to polish the plugs, wrapping a cord around a plug and sawing the latter

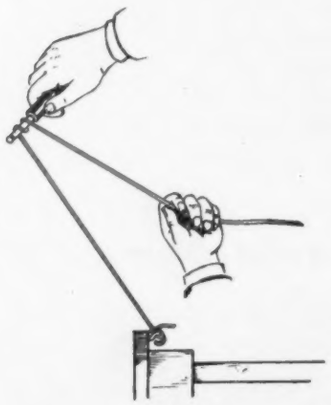

Fig. 1—Method of Polishing Switchboard plugs.

back and forth in the cord will do a quicker and easier job.

His method is as follows: Strip the outer covering of a worn out desk stand or receiver cord and fasten one end of the covering to a nail or vise on a bench. Take the plug in one hand and hold the end of the cord in the other hand so that the cord is taut. Make one full wrap of the cord around the plug as illustrated in Figure 1 and then saw the plug back and forth, allowing just enough slack in the cord so that it slips easily. When sufficiently polished, the plug should be wiped clean with a dry cloth.

Our opinion is that this method is especially good for polishing plugs that are still attached to the cord as on switchboards. We thank Mr. Harrington for his excellent suggestion.

**Q. Occasionally we have had trees or other objects fall on a drop wire breaking the wire off near its attachment on building, pole or cable strand. In such cases, the trouble man has to climb a ladder to the attachment of the drop wire, remove the wire from the clamp, and bring it down to the ground to splice to the rest of the span. He then has to climb up to the attachment and haul the wire up for refastening. Has some method been developed whereby the troubleman does not have to take the wire down for resplicing, especially where the wire is in good condition and does not have a new section spliced into it?**

**A.** If the wire break is not too far from the attachment, it is possible to use a "slack block" arrangement made up of two drop wire clamps linked together by a short piece of sash chain as shown in Figure 2 to hold together the two ends of the wire for the splicing operation. This method makes it unnecessary to take the wire down for resplicing.

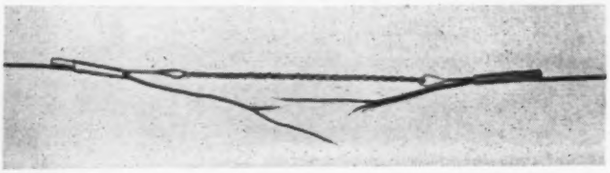

Fig. 2 — Method of holding together ends of broken drop wire for resplicing.

**Q. When stringing wires in an open-wire lead should we make allowance for stretching of the wires under ice loads in determining the proper clearance from the ground for the wire spans?**

**A.** Ordinarily, the minimum vertical wire clearances as specified in the National Electrical Safety Code are based on the so-called final unloaded sag, which means the sag after storm loading has been applied. The code, however, also provides that in cases where the telephone company maintains the wires at approximately the initial unloaded sag (stringing sag), the minimum clearances may be based on wire sags at the time of the construction of the line. It is generally the practice of telephone companies to pull slack in their open wires after storms or during outside plant overhauls to prevent swinging shorts due to uneven wire sags. To be on the safe side, it might be well to allow a few inches more than the minimum allowed in determining the proper wire clearances.

**Q. Our main frame is of the horizontal type. We frequently find cases of line shorts traced to shorts between vertical lugs, sometimes due to solder falling between them. At other times there is no visible indication of a short at the lugs, though an ohmeter shows the present of a short circuit at this location. What would be the cause?**

**A.** If you will take the terminal block apart at the location of the short, you will find that hot solder has worked into the thin space between the block sections and bridged across from lug to lug. This trouble is caused by using too much solder in soldering jumpers to the terminal lugs. Be sure to use no more solder than necessary to make a good connection and you will find that there will be no solder running down the lugs to cause trouble later on.

### Free Help on Problems

If you don't see a ready answer to your questions, let TELEPHONE ENGINEER's staff of technical men tackle it for you. This is a free service. Your question and the resulting answer may not only solve your problem but help the many other telephone men reading these columns. Jot your questions on a postcard and look to LINE and DESK for reply.

Executive personnel of new Oakland, California, plant of The American Coach & Body Company include (left to right): Fred C. Hall, vice president and general manager; Andro J. Macho, assistant secretary and controller, and Henry Kipp, chief engineer.

## New California Plant for American Coach & Body Co.

The American Coach & Body Company, Cleveland, Ohio, has established operations in California with a plant at 432 Fifth Street, Oakland. Executive personnel include Fred C. Hall, vice president and general manager; Andro J. Macho, assistant secretary and comptroller, and Henry Kipp, chief engineer.

The California plant will supplement the Cleveland production of standard utilities equipment, bodies, and aerial ladders for motor vehicles, covering coastal and mountain states.

Fred C. Hall has had diversified experience in the telephone industry, including supervision of the utility fleet for the Lincoln (Neb.) Telephone & Telegraph Co. He has had many years' experience as a civil engineer and a utility engineer. During the war he operated a steel fabricating company. Mr. Hall has been associated with The American Coach & Body Company for seven years.

Andro J. Macho has been with American Coach & Body Company for 10 years. He enlisted in the United States Coast Guard in 1942, and was honorably discharged in September, 1945, as a Chief Yeoman.

Henry F. Kipp has been closely identified with the truck body business for 26 years with Anheuser & Busch, Rochik Body Co., and Mueck Auto Body Co., all of St. Louis, Mo. He joined the airplane division of Curtiss-Wright in 1940, and moved to the Ohio Aircraft Fixture Co., in 1945 as chief engineer. Mr. Kipp joined The American Coach & Body Company this year.

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## Worner Electronics To Have New Plant In Rankin, Ill.

Worner Electronics Devices of Chicago, Illinois, manufacturers of industrial electronic equipment and intercommunications systems, have announced that the company will soon be located in their own new, large plant in Rankin, Illinois.

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(Please turn to page 76)


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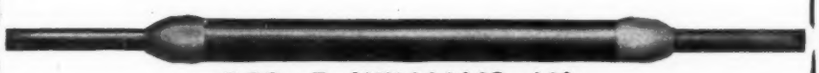

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lineman's climbers, belts and safety equipment, has announced the following changes in its distributing organization.

E. R. Tree has been appointed Mid-Western district sales manager. Mr. Tree is a graduate electrical engineer. Prior to coming with Buckingham, he was New York Metropolitan sales engineer for Davis Emergency Equipment Signal Corp. as general sales manager, and with American Society of Mechanical Engineers as managing editor of engineering publications.

Lewis Electrical Co., 560 No. 16th Street Philadelphia, Pa. has been appointed in Eastern Pennsylvania, Southern New Jersey, Delaware, and Maryland. L. R. Lewis, president of the company, was previously chairman of the board of Electric Power Equipment Corp., manufacturers of electrical switch-gear.

J. J. Costello Co., 131 Clarendon Street, Boston, Mass. has been appointed Buckingham representative in the New England territory.

◆

## Cook Employees Serve Country Without Casualty

Congratulations are in order for the 150 Cook Electric Co. men and women who served in the Armed Services during the Second World War and returned to their families without casualty.

◆

## Benwood-Linze Company Resumes Operations

The Benwood-Linze Company, St. Louis, Missouri, has announced resumption of operations following settlement of a production strike that has tied up all activities since June 26th.

The Company markets B-L Selenium and Copper Sulphide Metallic Rectifiers, B-L Superchargers (fast battery chargers), B-L Battery Boosters (trickle chargers), B-L Auto Radio Filterpacs, B-L Organ Power Units and other special power units for converting AC to DC.

Preparations are now under way toward full scale operations at the earliest possible date. Every possible effort will be expended, not only to maintain the quality of their products, but to render better service than ever before.

◆

## Book Review

HANDBOOK FOR TELEPHONE MANAGERS AND ENGINEERS, edited by B. C. Burden; published by Automatic Electric Company, 1033 West Van Buren Street, Chicago 7, Illinois. Volume I, 297 pp. 5½x8. Price $3.00 post paid.

Post war conditions call for notable expansion in the field of communications. The addition of new employees, many of whom require supplemental training, in restoring the depleted staffs of telephone companies make an authoritative telephone hand book particularly timely. The publication of this volume by the AUTOMATIC ELECTRIC COMPANY at this time is in recognition of this situation. The book is so arranged as to be particularly adaptable to the need for technical information in complete and readily accessible form.

Handbooks for use in other fields of technical activity have long been available and this publication discloses the arrangement and general set up for a reference work of this class that has long been sought by time and labor saving men.

Volume I (the complete set will comprise two volumes) deals with the design, construction and maintenance of outside telephone plant. In connection with the four sections devoted to telephone plant two complete sections are devoted to useful information and often required electrical computations. It is this type of information which is most often difficult to find readily and its inclusion in the first two sections of the volume makes it readily accessible in one convenient suitable place. A detailed index makes the location of any subject in the book very easy.

The section headings in Volume I are:

(1) Useful Data
(2) Electrical Equations and Computations
(3) Telephone Pole Line
(4) Open Wire Plant
(5) Telephone Cable Plant
(6) Underground Cable Conduit

The book throughout is profusely and clearly illustrated. The text style is clear and easy to understand and the use of difficult mathematics has been studiously avoided to make the work useful to all telephone men. Information is shown in tables whenever that form of presentation gives the data in the most complete form. Subjects involving comparative relations are especially suitable for this plan and are so shown. In section one a four piece table of logarithms and a four place table of trigonometric functions is included.

The editor of this Handbook, B. C. Burden, formerly Technical Editor of TELEPHONE ENGINEER, needs no introduction in the telephone field. For many years he has contributed to publications in that field, he has been a frequent speaker at telephone conventions and was formerly the Chief Engineer of The United States Independent Telephone Association.

Volume II, now in course of preparation will treat of transmission, protection, carrier equipment, substation apparatus, and testing and central office equipment. The price and date of probable availability of Volume II will be announced later. Every telephone manager and engineer will wish to add these volumes to his reference library.

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**Statement of the Ownership, Management, Circulation, Etc., Required by the Act of Congress of March 3, 1933,**

of Telephone Engineer and Management, published monthly at Pontiac, Illinois, for October 1, 1946.

State of Illinois, County of Cook, ss.— Before me, a notary public in and for the State and county aforesaid, personally appeared Ray W. Smith, who, having been duly sworn according to law, deposes and says that he is the editor of the Telephone Engineer and Management, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc, of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Telephone Engineer Publishing Corp., 7720 Sheridan Road, Chicago, Illinois.

Editor—Ray W. Smith, 7720 Sheridan Road, Chicago, Illinois.

Business Managers—Ray W. Smith & Roy F. Smith, 7720 Sheridan Road, Chicago, Illinois.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address as well as those of each individual member must be given.)

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3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent or more of total amount of bonds, mortgages or other securities are: (If there are none, so state.)

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RAY W. SMITH,
Editor.

Sworn to and subscribed before me this 21st day of September, 1946.

(My commission expires Sept. 20th, 1947.)
(Seal) B. W. BECKING,
Notary Public.

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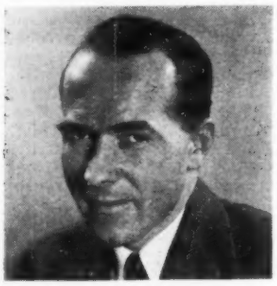

By JOHN G. REYNOLDS
Managing Editor

## EGG BASKET TALK!

When we finally reach the back page each month, it seems that all of the ideas and items planned during the month suddenly pop up, and our slave-driving typewriter just won't quit bouncing until we wind up the editorial job and the issue with a few Highlights.

For example: During the recent USITA convention we often heard the old truism—*"management and employees have their eggs in the same basket."* One prominent Independent enlarged the statement by saying—"There is little which affects the stability of any company which does not affect the security of the employees. If either management or labor exploits or cheats the other, the basic interests of both are harmed."

• • •

## LEE DE FOREST SPEAKS UP!

In a recent letter to the Chicago Tribune's "Voice of the People", Lee DeForest, father of modern-day radio, let loose with a blast that deserves repeating:

"Many words are spoken on behalf of a great industry which thrives chiefly on spoken words," wrote Mr. DeForest. "Broadcasting depends largely on the tongue and jaw muscles, plus breath, of thousands of men standing before microphones, at so much per syllable.

"One wonders if our simian ancestors had any conception that ages later such monkey chatter as they originated could some day be transformed into the essentials of livelihood. Of such are the mysteries of evolution.

"Yet, withal, I am still proud of my child. Here and there from every station, come each day some brief flashes worth the hearing, some symphony, some intelligent debate, some playlet worth the wattage. The average mind is broadening, and despite all the debasement of most of radio's offerings, our music tastes are slowly advancing. Some day the program directors will attain the intelligent skill of the engineer who erected his towers and built the marvel which he now so ineptly uses."

To which most all of us can add our fervent "amen".

• • •

## LAND OF RISING SUN ENGLISH

A manager up to his own ears in mail from persons wanting telephone service in the shortest possible time, writes in to tell of a sign in Yokohama which reads: *"Give Us Your Baggage And We Will Send It In All Directions."* This sign recently received the irate attention of a certain Itu Hiuski, who wrote the baggage man: "I damn seldom find where my suitcase are. She no fly. You no more fit to bagge master than for crysake, that all I hope. What's the matter you?" . . .

Our friend who sent in this gem of a complaint, stated that there must be some similar gems discussing telephone service and that we should search them out. Well, how about it? Got a real fancy letter in your file? Send it in.

• • •

## RATIONALIZE ENGLISH SPELLING

If a certain Dr. Gordon Dewey, secretary of the Simplified Spelling Board, succeeds in his efforts to rationalize the English spelling, *telephone* may be spelled *"telefone,"* *wire* will be *"wir"*, and *foreman* will be *"forman."* Doctor Dewey's idea, if ever put into common use, would make *"Linken's Gettixzberg Adress"* read: "Forskor and sevn yeerz agoe our faadherz braut forth on dhis kontinent a neue naeshum konseeved in liberti and dedikaeted to dhe . . . "

That's plenty for this editor who has trouble enough with the way we spell things today.

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This is to CERTIFY that this coil of
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in its finished size, has been subjected to all the tests noted below, and found to fully meet the specification requirements.
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By C. A. Thomas, Inspector

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- **RESISTANCE TO RUST**
- **EXCELLENT VOICE AND HIGH FREQUENCY TRANSMISSION CHARACTERISTICS**
- **SAFETY IN LONG SPAN CONSTRUCTION**
- **EASY HANDLING AND LOWEST MAINTENANCE COSTS**

The thick covering of copper cannot flake, crack or peel. It is permanently molten-welded to a core of high-strength alloy steel and provides protection at all times.

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